Annex J Nevada Irrigation District

J.1 Introduction

This Annex details the hazard mitigation planning elements specific to the Nevada Irrigation District (NID or District), a previously participating jurisdiction to the 2016 Placer County Local Hazard Mitigation Plan (LHMP) Update. This Annex is not intended to be a standalone document, but appends to and supplements the information contained in the Base Plan document. As such, all sections of the Base Plan, including the planning process and other procedural requirements apply to and were met by the District. This Annex provides additional information specific to NID, with a focus on providing additional details on the risk assessment and mitigation strategy for this District.

J.2 Planning Process

As described above, the District followed the planning process detailed in Chapter 3 of the Base Plan. In addition to providing representation on the Placer County Hazard Mitigation Planning Committee (HMPC), the District formulated their own internal planning team to support the broader planning process requirements. Internal planning participants, their positions, and how they participated in the planning process are shown in Table J-1. Additional details on plan participation and District representatives are included in Appendix A.

Table J-1 NID – Planning Team

Name	Position/Title	How Participated
Greg Jones	Assistant General Manager	Oversite and Review
Chip Close	Water Operations Manager	Facility vulnerability and risk assessment as well as historical references
Doug Roderick	Engineering Manager	Capital improvement planning and forecasting
Keane Sommers	Hydroelectric Manager	Facility vulnerability and risk assessment as well as historical references

Coordination with other community planning efforts is paramount to the successful implementation of this LHMP Update. This section provides information on how the District integrated the previously approved 2016 Plan into existing planning mechanisms and programs. Specifically, the District incorporated into or implemented the 2016 LHMP through other plans and programs shown in Table J-2.

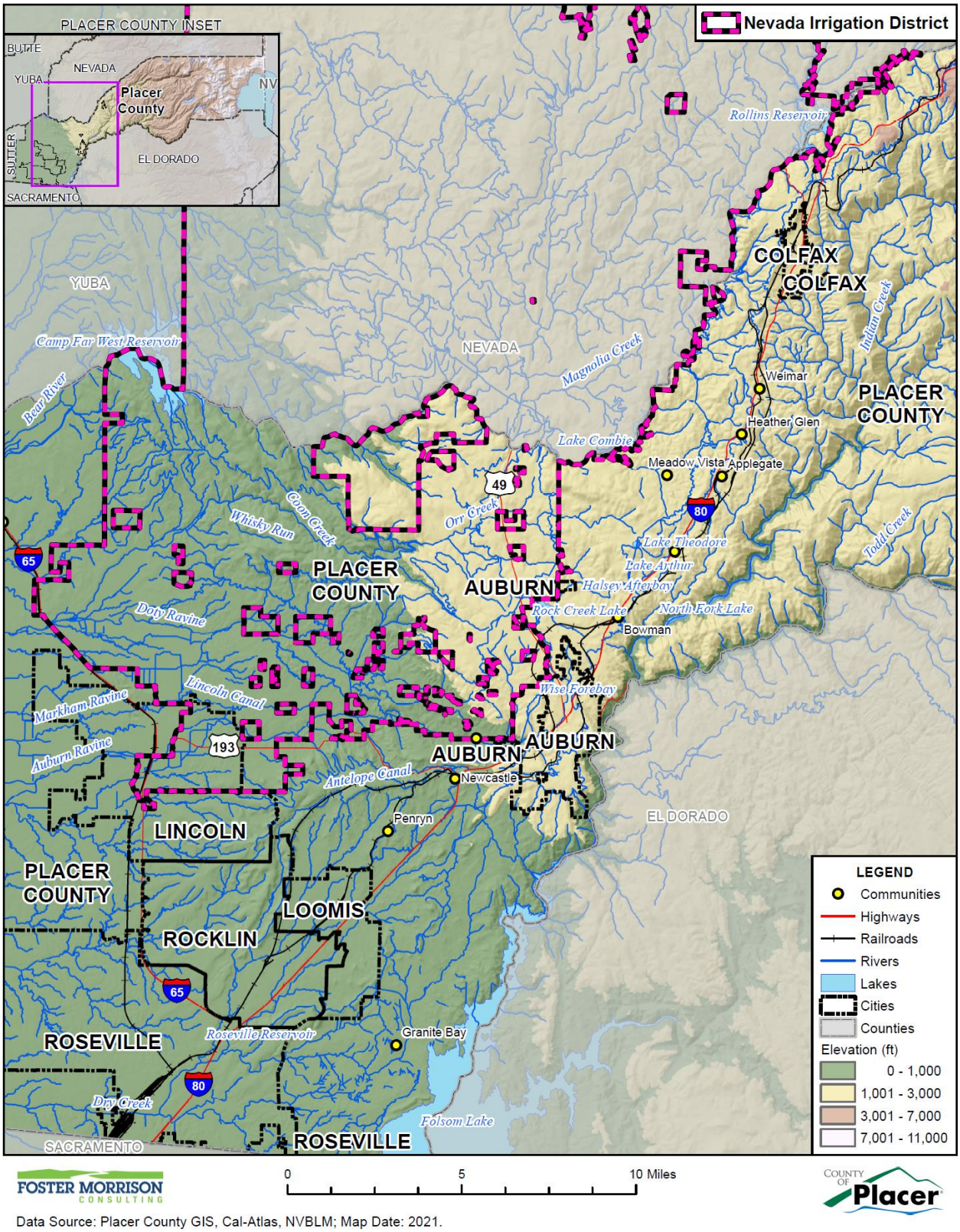
Table J-2 2016 LHMP Incorporation

Planning Mechanism 2016 LHMP Was Incorporated/Implemented In.	Details: How was it incorporated?
Capital Improvement Planning	Priority of projects were adjusted to meet level of risk

J.3 District Profile

The District profile for the NID is detailed in the following sections. Figure J-1 displays a map and the location of the District within Placer County.

Figure J-1 NID



Data Source: Placer County GIS, Cal-Atlas, NVBLM; Map Date: 2021.

J.3.1. Overview and Background

Formed in 1921, the Nevada Irrigation District is a diversified water resource agency that supplies over 30,000 homes, farms, and businesses in Nevada, Placer and Yuba Counties in the foothills of Northern California's Sierra Nevada Mountains. NID provides service in an expansive geographic area covering 287,000 acres that makes the District one of the largest in the State of California.

The District is organized primarily to supply water for irrigation, municipal, domestic, industrial, and hydroelectric purposes. NID collects water from the mountain snowpack on 70,000 acres of high mountain watershed and stores it in an extensive system of reservoirs. Water flows to customers in the foothills through over 500 miles of canals and another 400 miles of pipeline. Along the path, it is used to generate clean hydroelectric energy and to provide public recreational opportunities at NIDs multiple reservoirs and campgrounds.

The highest elevation on NID mountain watershed is the peak of 8,373-foot English Mountain which rises east of Bowman Reservoir. The District's highest reservoir is French Lake at 6,835 feet. The District's lowest elevation water service is located about 100 miles to the southwest, at 150 feet above sea level, south of Lincoln in Placer County.

NID has precipitation records for Bowman Reservoir (elev. 5,650 ft.) dating back to 1929. The 69.2-inch annual average precipitation at Bowman compares to an annual average of 56 inches at 2,700 feet near Nevada City and 52 inches at 2,400 feet in Grass Valley.

Irrigation Water

NID has supplied an average 150,000 acre-feet of water per year. About 90 percent of this total is used for local agriculture. NID serves approximately 5,600 raw water customers. Most purchase their water on a seasonal basis — the six-month irrigation season normally runs from on or about April 15 through October 14. Some irrigation customers purchase both summer and winter water for year-around service.

Irrigation water is used to irrigate pasture, golf courses, gardens, nurseries, orchards, and vineyards for both commercial and home production. Grapes, apples, peaches, nuts, berries, corn, rice, wheat, and oats are among the many crops grown with NID water.

Many customers realize other benefits from NID Irrigation water including filling ponds and reservoirs for stock watering, fire suppression, and recreation. Availability of irrigation water is an important factor in the preservation of open space, and greenbelt areas. There are an estimated 97,000 irrigable acres in the Nevada Irrigation District, about a third of which are presently in irrigation.

Treated Drinking Water

Through the years, NID service has changed along with the communities it supplies. The District continues to supply irrigation water, as it has since the 1920s, but today's demand is for piped and treated drinking water.

NID's treated water service areas are located in and around Grass Valley and Nevada City, Alta Sierra, Lake of the Pines, Penn Valley, Lake Wildwood, Smartville, and North Auburn areas.

Generally, treated water is available in the more populated areas, as it can be very expensive to extend treated water main lines into rural areas where there are few customers to share the costs. In recent years, the District has been successful in working with local property owners to form local water quality improvement districts.

The transition to treated drinking water began in the late 1960s and early 1970s when NID constructed its first water treatment plants. Today, the District operates a network of six modern water treatment plants in Nevada, Placer, and Yuba counties.

NID presently produces about 3 billion gallons — approximately 9,000 acre-feet — of treated drinking water per year. The district's treatment plants are operated by state-licensed and certified technicians. Water treatment processes include chlorination, coagulation, flocculation, sedimentation, and filtration.

NID treated water meets and exceeds standards set by the California Department of Health Services. As required by state law, NID produces an annual water quality report, the Consumer Confidence Report, which is distributed each spring to each treated water customer.

NID's flushing program is conducted annually in the winter months and is designed to keep treated water pipelines clean and ensure a fresh, high quality water supply.

Recreation

The Nevada Irrigation District manages 29 reservoirs in the foothills and mountains of the Northern Sierra providing recreational opportunities such as hiking, camping, boating, fishing, and swimming.

At Rollins and Scotts Flat reservoirs, NID provides public parks, trails, campgrounds and beaches for the community's enjoyment. Higher up in the mountains, NID maintains and operates campgrounds in the Jackson Meadows and Bowman Lake areas.

Sierra Foothill Recreation

Camping, fishing, swimming, sunning, boating, water skiing, sailing, kayaking and other activities are popular at both Rollins and Scotts Flat reservoirs in the Sierra foothills. Day use parks, campgrounds and beaches are operated by NID and in some cases, by private operators, under contract with NID.

Scotts Flat is situated among the tall pines at the 3100-foot elevation nine miles east of Nevada City via Highway 20 and Scotts Flat Road. It offers 169 campsites at two large campgrounds, plus a group camp. Across the lake, accessible via Red Dog and Quaker Hill Roads from Nevada City, is the Cascade Shores Day Use Area. Scotts Flat is a popular spot for swimming, boating and water Skiing

Rollins Reservoir, located at the 2100-foot elevation off Highway 174 between Grass Valley and Colfax, has four independently operated campgrounds. Long Ravine, Greenhorn, Orchard Springs and Peninsula

offer a combined 250 campsites and a complete range of services including stores, restaurants, fuel sales and rentals.

Sierra Mountain Recreation

At higher elevations in the Sierras, NID maintains and operates campgrounds and recreational facilities in the Jackson Meadows – Bowman Lake areas.

Jackson Meadows features several campgrounds, picnic day use sites and boat ramps.

At Bowman Lakes area, campgrounds are located at Bowman, Canyon Creek, Sawmill and Faucherie Lakes in the Bowman corridor.

The primary recreation season in the high mountain areas generally runs from Memorial Day through Labor Day, depending on weather.

We Partner for Trails

Trails help to cultivate a healthy community. NID partners with the Bicyclists of Nevada County (BONC), Youth Bicyclists of Nevada County (YBONC) and the Bear Yuba Land Trust to provide multiuse trails for recreation. The trails we provide at Scotts Flat Lake and Rollins Lake attract hikers and bicyclists from throughout the region.

Hydroelectric

NID is a leader among northern California water agencies in the production of clean, renewable hydropower. Operating seven hydropower plants, it generates enough electricity to supply the District's own energy needs plus that of about 60,000 homes.

NID began producing electricity in 1965 with the completion of the $65 million Yuba-Bear Power Project. The original project included the Chicago Park and Dutch Flat powerhouses and, in 1980, the Rollins and Bowman powerhouses were added. Additional small power plants were added during the 1980s at Scotts Flat and Combie reservoirs to make use of existing water releases.

The District has power sales agreements that market NID's electricity to the Pacific Gas & Electric Company and the Northern California Power Agency. NID’s Hydropower operations are a huge win for customers. In addition to contributing millions in revenues from power sales to offset water rates for the customer, Hydro also covers all of the costs of upper division water storage, conveyance, delivery, maintenance, and operations from the headwaters of the Middle and South Yuba Rivers, Bear River, Canyon Creek, and Deer Creek watersheds through the District’s mid-elevation storage reservoirs of Scotts Flat, Rollins and Combie.

NID's hydropower facilities include 13 reservoirs and 20.75 miles of pipes, flumes, tunnels and open ditch canals.

J.4 Hazard Identification

NID identified the hazards that affect the District and summarized their location, extent, frequency of occurrence, potential magnitude, and significance specific to District (see Table J-3).

Table J-3 NID—Hazard Identification Assessment

Hazard	Geographic Extent	Likelihood of Future Occurrences	Magnitude/ Severity	Significance	Climate Change Influence
Agriculture Pests and Diseases	Significant	Highly Likely	Limited	Medium	Medium
Avalanche	Limited	Likely	Limited	Medium	Medium
Climate Change	Extensive	Highly Likely	Critical	High	High
Dam Failure	Significant	Unlikely	Critical	High	Medium
Drought & Water Shortage	Extensive	Occasional	Critical	High	High
Earthquake	Extensive	Occasional	Critical	Medium	Low
Floods: 1%/0.2% annual chance	Limited	Occasional	Critical	High	Medium
Floods: Localized Stormwater	Limited	Highly Likely	Limited	Medium	Medium
Landslides, Mudslides, and Debris Flows	Limited	Occasional	Limited	Medium	Medium
Levee Failure	Limited	Unlikely	Limited	Medium	Medium
Pandemic	Extensive	Occasional	Critical	High	Medium
Seiche	Limited	Unlikely	Limited	Low	Medium
Severe Weather: Extreme Heat	Extensive	Highly Likely	Limited	Medium	High
Severe Weather: Freeze and Snow	Extensive	Highly Likely	Critical	Medium	Medium
Severe Weather: Heavy Rains and Storms	Extensive	Highly Likely	Critical	High	Medium
Severe Weather: High Winds and Tornadoes	Limited	Highly Likely	Critical	Medium	Low
Tree Mortality	Extensive	Highly Likely	Limited	Medium	High
Wildfire	Extensive	Highly Likely	Critical	High	High

Geographic Extent
Limited: Less than 10% of planning area
Significant: 10-50% of planning area
Extensive: 50-100% of planning area

Likelihood of Future Occurrences
Highly Likely: Near 100% chance of occurrence in next year, or happens every year.
Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Magnitude/Severity
Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths
Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability
Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability
Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid

Significance
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

Climate Change Influence
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

J.5 Hazard Profile and Vulnerability Assessment

The intent of this section is to profile the District's hazards and assess the District's vulnerability separate from that of the Placer County Planning Area as a whole, which has already been assessed in Section 4.3 Hazard Profiles and Vulnerability Assessment in the Base Plan. The hazard profiles in the Base Plan discuss overall impacts to the Placer County Planning Area and describes the hazard problem description, hazard location and extent, magnitude/severity, previous occurrences of hazard events and the likelihood of future occurrences. Hazard profile information specific to the District is included in this Annex. This vulnerability assessment analyzes the property and other assets at risk to hazards ranked of medium or high significance specific to the District. For more information about how hazards affect the County as a whole, see Chapter 4 Risk Assessment in the Base Plan.

J.5.1. Hazard Profiles

Each hazard vulnerability assessment in Section J.5.3, includes a hazard profile/problem description as to how each medium or high significant hazard (as shown in Table J-3) affects the District and includes information on past hazard occurrences and the likelihood of future hazard occurrence. The intent of this section is to provide jurisdictional specific information on hazards and further describes how the hazards and risks differ across the Placer County Planning Area.

J.5.2. Vulnerability Assessment and Assets at Risk

This section identifies the District's total assets at risk, including values at risk, populations at risk, critical facilities and infrastructure, natural resources, and historic and cultural resources. Growth and development trends are also presented for the District. This data is not hazard specific, but is representative of total assets at risk within the District.

Assets at Risk and Critical Facilities

This section considers the NID's assets at risk, with a focus on key District assets such as critical facilities, infrastructure, and other District assets and their values. With respect to District assets, the majority of these assets are considered critical facilities as defined for this Plan. Critical facilities are defined for this Plan as:

> ***Any facility, including without limitation, a structure, infrastructure, property, equipment or service, that if adversely affected during a hazard event may result in severe consequences to public health and safety or interrupt essential services and operations for the community at any time before, during and after the hazard event.***

This definition is further refined by separating out three classes of critical facilities:

> ***Class 1 facilities include those facilities that contribute to command, control, communications and computer capabilities associated with managing an incident from initial response through recovery.***

Class 2 facilities include those facilities that house Emergency Services capabilities.

Class 3 facilities are those facilities that enable key utilities and can be used as evacuation centers/shelters/mass prophylaxis sites, etc.

Additional information on the three classes of critical facilities is described further in Section 4.3.1 of the Base Plan.

Table J-4 lists critical facilities and other District assets identified by the District Planning Team as important to protect in the event of a disaster. NID's physical assets, valued at over $1.4 billion, consist of the buildings and infrastructure to support the District's operations.

Table J-4 NID Critical Facilities, Infrastructure, and Other District Assets

Name of Asset	Facility Type	Replacement Value	Hazard Info
Rollins Power House	Critical Facilities	$19,170,815	Earthquake, Flood, Wildfire, Tree Mortality
Combie South Power House	Critical Facilities	$5,334,820	Earthquake, Flood, Wildfire, Tree Mortality
Dutch Flat Afterbay	Critical Facilities	$400,000,000	Earthquake, Flood, Fire
Rollins Reservoir	Critical Facilities	$500,000,000	Earthquake, Flood, Wildfire, Tree Mortality
Combie Reservoir	Critical Facilities	$250,000,000	Earthquake, Flood, Wildfire, Tree Mortality
North Auburn Water Treatment Plant	Critical Facilities	$3,713,610	Earthquake, Flood, Wildfire, Freeze and Snow
Water Canal System	Critical Facilities	$66,361,517	Earthquake, Flood, Freeze and Snow, Wildfire, Tree Mortality, Landslide
Orr Creek Reservoir	Critical Facilities	$2,000,000	Earthquake, Flood
Pickett Reservoir	Critical Facilities	$100,000	Earthquake, Flood
Buildings and Warehouses	Critical Facilities	$2,000,000	Earthquake, Flood, Wildfire, Tree Mortality
Administration Buildings	Critical Facilities	$4,450,00	Earthquake, Flood, Wildfire, Tree Mortality
Pipelines and Tanks	Critical Facilities	$34,110,630	Earthquake, Flood, Wildfire, Tree Mortality
Other assets	Critical Facilities	$147,000,000	Earthquake, Flood, Wildfire
Total		**$1,429,795,842**	

Source: NID

Populations Served

Also potentially at risk should the District be affected by natural hazard events are the populations served by the District. NID provides domestic water service to over 19,500 service connections representing a population of over 100,000,000 people. In addition, the District provides wholesale water utilized by other

municipalities to supply another 6,000 plus homes. The District also provides irrigation water to more than 5,500 farms and properties throughout Placer, Nevada and Yuba Counties.

Natural Resources

NID has a variety of natural resources of value to the District. Several state or federally listed species may be found within the District boundary. These are identified, along with other species of concern found in the District, in Table J-5 and Table J-6.

Table J-5 Plant Species of Concern in the Nevada Irrigation District

Name	Status	Habitat	Potential Occurrence
Dwarf downingia *Downingia pusilla*	CNPS 2.2	Vernal Pools in valley foothill grasslands	Unlikely to occur. No appropriate habitat in the project area. Nearest known occurrence 2.2 air miles northwest of downtown Lincoln, 1.2 road miles south of Wise Road/Hwy. 65 intersection.
Legenere *Legenere limosa*	CNPS 1B.1	Vernal pools and swales, seasonal marshes, artificial ponds, floodplains of intermittent streams, and other seasonally inundated habitats.	May occur in floodplains of intermittent streams in the project area. Known from only two occurrences in the project vicinity. One located north of Pleasant Grove Creek, south of Placer Boulevard, east of Highway 65. The second is at the Orchard Creek Conservation Bank approximately 3 miles southwest of Lincoln (Jones & Stokes 2002).
big-scale balsamroot *Balsamorhiza macrolepis var. macrolepis*	CNPS 1B.2	Chaparral, cismontane woodland and valley and foothill grassland, and vernally moist meadows on sandstone, serpentine, or basalt outcrops. From 300 to 4,600 feet in elevation.	Added to table August 2009, no analysis for the project area completed.
Stebbins's morning-glory *Calystegia stebbinsii*	FE, CE, CNPS 1B.1	Chaparral (openings), cismontane woodland, serpentinite or gabbroic. 600–2,400 ft.	Unlikely to occur. No appropriate habitat present in the project area. This plant is known from fewer than 15 occurrences in specific, isolated areas of Nevada and El Dorado counties (CDFG 2004).
Dubious pea *Lathyrus sulphureus var. argillaceus*	CNPS 3	Cismontane woodland, chaparral, lower and upper montane coniferous forest. Usually full sun to part shade, woodland openings. 500–1,000 ft.	May occur in woodland habitats on the project site.
Ahart's Dwarf Rush *Juncus leiospermus var. ahartii*	CNPS 1B.2	Vernal pool margins and mesic valley and foothill grassland areas at elevations of 30–100 meters.	May occur in non-native grassland habitats in the project area. Reported in Placer County only from one occurrence at the Lincoln Airport.

Name	Status	Habitat	Potential Occurrence
Red Bluff Dwarf Rush *Juncus leiospermus var. leiospermus*	CNPS 1B.1	Meadows and seeps, vernal pools, and vernally mesic areas in chaparral, cismontane woodland, and valley and foothill grassland from 115 to 3,350 feet.	May occur in woodland and non-native grasslands habitats. Known from north of Roseville in 1982, but was relocated in 1997 (CNDDB 2002).
Butte County fritillary *Fritillaria eastwoodiae*	CNPS 3	Chaparral, cismontane woodland, lower montane coniferous forest (openings), wet and dry slopes red clay or sandy loam. 100–5,000 ft.	May occur in woodland habitats on the project site.
Brandegee's clarkia *Clarkia biloba ssp. brandegeae*	CNPS 1B.2	Chaparral, cismontane woodland, often roadcuts. 900–3,000 ft.	May occur in woodland habitats on the project site. The nearest occurrences are in the Lake Combie Quad along the Bear River (CDFG 2004).
Boggs Lake Hedge-hyssop *Gratiola heterosepala*	CE, CNPS 1B.1	Foothill Riparian	May occur in riparian habitat present in the project area. Known from only three occurrences in the project vicinity. Two of these occurrences are located between Rocklin and Roseville; the third is located just north of Lincoln (Placer County 2003).
Pincushion navarretia *Navarretia myersii ssp. myersii*	CNPS 1B.1	Vernal pools, valley and foothill (non-native) grasslands in clay soils. 66–1,083 feet	Northern limits of City of Lincoln. Exact location unknown (needs more fieldwork).
Status Codes:			
Federal FE = Federally listed as Endangered FT = Federally listed as Threatened FC = Federal Candidate species	State CE = California listed as Endangered CT = California listed as Threatened CR = California listed as Rare CSC = California Species of Concern CFP = California Fully Protected		California Native Plant Society 1B = rare, threatened or endangered in California and elsewhere. 2 = rare in California but more common elsewhere. 3 = need more information 4 = plants of limited distribution; a watch list. _.1 = Seriously endangered in California (over 80% of occurrences threatened / high degree and immediacy of threat) _.2 = Fairly endangered in California (20-80% occurrences threatened) _.3 = Not very endangered in California (<20% of occurrences threatened, or no current threats known)

Status and habitat information from California Natural Diversity Database (CDFG 2004), California Native Plant Society Electronic Inventory (CNPS 2003), and USFWS Official Species Lists.

[1]Based on table presented in the Lincoln Area Water Treatment Plant Planning and Site Study (NID 2005). Updated by Robertson-Bryan, Inc. for internal use only by NID (August 2009)

Table J-6 Wildlife Species of Concern in the Nevada Irrigation District

Name	Status	Habitat	Potential Occurrence
Invertebrates			
Vernal pool fairy shrimp *Branchinecta lynchi*	FT	Found in vernal pools (seasonal wetlands)	Unlikely to occur. No appropriate habitat present.
Vernal pool tadpole shrimp *Lepidurus packardi*	FE –	Vernal pools containing clear to highly turbid water.	Unlikely to occur. No appropriate habitat present.
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	FT –	Associated with various species of elderberry shrubs (Sambucus spp.); generally occurs along waterways and in floodplains.	May occur if elderberry shrubs are present in the project area. Nearest known occurrences in the vicinity of the Lincoln airport and Lincoln Rodeo Grounds.
Fish			
Delta smelt *Hypomesus transpacificus*	FT CT	Found only in the Sacramento-San Joaquin Estuary and they reside primarily in the interface between salt and freshwater. Decline in population due in large part to reductions in delta water outflow.	Unlikely to occur. Project is located outside of species' known distribution.
Longfin smelt *Spirinchus thaleichthys*	– CT, CSC	In the Sacramento-San Joaquin estuary adults and juveniles can be found in water ranging from nearly pure sea water to completely fresh water. Adult and juvenile longfin smelt occupy mostly the middle or bottom of the water column in the salt or brackish water portions of the estuary, although larval smelt are concentrated in near-surface brackish waters. Spawning takes place in fresh water, over sandy-gravel substrates, rocks, and aquatic plants.	Unlikely to occur. Project is located outside of species' known distribution.
Central Valley steelhead *Oncorhynchus mykiss irideus*	FT –	Found in tributaries to the San Francisco Bay, including the south Bay. Pass through the San Francisco Estuary during migration to streams for spawning, and during outmigration to the ocean. Spawn in small streams and tributaries with cold, clean water flowing over graveled bottoms and deep pools.	Rainbow trout/steelhead adults and fry have been seen in Coon Creek, Auburn Ravine, Dry Creek, Secret Ravine, and Miners Ravine (CALFED Bay-Delta Program 2000).
Central Valley spring-run chinook salmon *Oncorhynchus tshawytscha*	FT CT	Found in tributaries to the San Francisco Bay. Pass through the San Francisco Estuary during migration to streams for spawning, and during outmigration to the ocean. Spawn in well oxygenated water in swift, shallow riffles, or at edges of fast runs with loose gravel.	Unlikely to occur. Project is located outside of species' known distribution.

Name	Status	Habitat	Potential Occurrence
Sacramento winter-run chinook salmon *Oncorhynchus tshawytscha*	FE CE	Found in tributaries to the San Francisco Bay. Pass through the San Francisco Estuary during migration to streams for spawning, and during outmigration to the ocean. Spawn in well oxygenated water in swift, shallow riffles, or at edges of fast runs with loose gravel.	Unlikely to occur. Project is located outside of species' known distribution.
Central Valley fall/late fall-run chinook salmon *Oncorhychus tshawytscha*	– CSC	Found in tributaries to the San Francisco Bay, including the south Bay. Pass through the San Francisco Estuary during migration to streams for spawning, and during outmigration to the ocean. Spawn in well oxygenated water in swift, shallow riffles, or at edges of fast runs with loose gravel.	The Bear River supports an occasional run of adult fall-run chinook salmon in years when flows are sufficient to provide passage (Yoshiyama et al. 1996).
Green sturgeon *Acipenser medirostris*	FT CSC	In the Sacramento River, adult sturgeon are in the river, presumably spawning, when temperatures range between 8 14°C. Preferred spawning substrate likely is large cobble, but can range from clean sand to bedrock.	Unlikely to occur. Project is located outside of species' known distribution.
Amphibians			
California tiger salamander *Ambystoma californiense*	FT CSC	Breeds in freshwater ponds or vernal pools, in association with upland areas with small mammal burrows	Unlikely to occur. Project is located outside of species' known distribution.
Western spadefoot toad *Spea hammondii*	– CSC	Requires vernal pools and seasonal wetlands below 4,500 feet that lack predators for breeding. Also occurs in grassland habitat and occasionally in valley-foothill oak woodlands and orchards.	Unlikely to occur. Project is located outside of species' known distribution.
California red-legged frog *Rana aurora draytonii*	FT CSC	Breeds in quiet streams and permanent, deep, cool ponds with overhanging and emergent vegetation below 5,200 feet elevation. Known to occur adjacent to breeding habitats in riparian areas, heavily vegetated streamside shorelines, and non-native grasslands. Sierran streams historically supported populations of red-legged frog; however, these populations have been eliminated.	Unlikely to occur. Project supports minimal suitable habitat and species in not known from the project vicinity. Project area is not designated by USFWS as critical habitat or a core recovery unit. However, the project area is in the historical range of the species. Nearest known occurrence is in El Dorado National Forest, near Michigan Bluff (CNDDB 2004).
Foothill yellow-legged frog *Rana boylii*	– CSC	Inhabits valley and foothill oak woodland, riparian forest, ponderosa pine, mixed conifer, coastal scrub, mixed chaparral, and wet meadows. Breeds in rocky streams with cool, clear water from 0 to 4,500 feet.	Appropriate habitat present in intermittent drainages within the proposed project site. Nearest known occurrences are located in Missouri Creek Canyon in Tahoe National Forest and Greenhorn Creek, where two adults were detected in 1999 (CDFG 2004).

Name	Status	Habitat	Potential Occurrence
Reptiles			
Western pond turtle *Actinemys marmorata*	– CSC	Occurs up to 6,000 feet in perennial wetlands and slow moving creeks and ponds with overhanging vegetation. Requires suitable basking sites such as logs and rocks above the waterline.	Appropriate habitat present in Orr Creek Reservoir and stock ponds located within the project area. Nearest known occurrences are located 4 mi. WNW of Newcastle and on Wolf Creek in Nevada County (CDFG 2004).
California horned lizard *Phrynosoma coronatum frontale*	– CSC	Occurs in riparian woodlands and annual grasslands, exposed sandy-gravelly substrate with scattered shrubs, and clearings from 0 to 6,500 feet.	Appropriate habitat present in the non-native grasslands in the project area. Nearest known occurrences are 2.5 miles west of Highway 49 and 20 Junction in Nevada City and on Alta Vista Road in Grass Valley (CDFG 2004).
Giant garter snake *Thamnophis gigas*	FT CT	Primarily associated with marshes and sloughs, less with slow-moving creeks, and absent from larger rivers. Nocturnal retreat is holes, especially mammal burrows, crevices, and surface objects. During the day the giant garter snake often basks on emergent vegetation such as cattails and tules.	Unlikely to occur. Project is located outside of species' known distribution.
Birds			
White-tailed (black shouldered) kite *Elanus leucurus*	– CFP	Inhabits herbaceous and open stages of most habitats mostly in cismontane California. Forages in undisturbed, open grasslands, meadows, farmlands and emergent wetlands.	Appropriate nesting and foraging habitat present within the project area.
Northern harrier (nesting) *Circus cyaneus*	– CSC	Frequents meadows, grasslands, open rangelands, desert sinks, fresh and saltwater emergent wetlands. Mostly found in flat, or hummocky, open areas of tall, dense grasses, moist or dry shrubs, and edges for nesting, cover, and feeding.	May forage in non-native grasslands and nest in the project area.
Swainson's hawk *Buteo swainsoni*	BCC CT	Breeds in stands with few trees in juniper-sage flats, riparian areas, and in oak savannah in the Central Valley. Forages in adjacent grasslands, suitable grain or alfalfa fields, or livestock pastures.	Unlikely to occur. Project is located outside of species' known distribution.
Ferruginous hawk (wintering) *Buteo regalis*	BCC –	Winter visitor along the coast from Sonoma County to San Diego County, eastward to the Sierra Nevada foothills and southeastern deserts, the Inyo-White Mountains, the plains east of the Cascade Range, and Siskiyou County. Prefers open terrain, plains, and foothills. Does not nest in California.	Winter Visitor. May forage in non-native grasslands in the project area.

Name	Status	Habitat	Potential Occurrence
Bald eagle *Haliaeetus leucocephalus*	FD (Delisted 7/9/07) CE, CFP (nesting and wintering)	Local winter migrant to various California lakes. Most of the breeding population is restricted to northern counties. Regular winter migrants to the region.	Foraging habitat present in Combie Reservoir.
American peregrine falcon *Falco peregrinus anatum*	Former FE (Delisted on 8/20/99), BCC CE, CFP (nesting)	Breeds in woodlands, forests, coastal habitats, and riparian areas near wetlands, lakes, rivers, or other water on high cliffs, banks, dunes, or mounds	Unlikely to occur. No appropriate habitat present in the project area.
California black rail *Laterallus jamaicensis*	BCC CFP, CT	Forages and nests in tidal emergent wetlands dominated by pickleweed or in brackish marshes supporting bulrushes and pickleweed; Usually found in immediate vicinity of tidal sloughs.	Unlikely to occur due to lack of suitable habitat. Previously unknown populations were recently discovered in the foothills of Nevada County (Tecklin 1990). Known to occur in isolated marshes along Garden Bar Road, McCourney Road, and in and near Spenceville Wildlife Area (CDFG 2004).
Mountain plover *Charadrius montanus*	BCC CSC	Short grasslands and plowed fields with little vegetation, and open sagebrush areas of the Central Valley from Sutter and Yuba counties southward.	Unlikely to occur. Project is located outside of species' known distribution.
Long-billed curlew *Numenius americanus*	BCC	Found in wet meadow habitat in northeastern California in Siskiyou, Modoc, and Lassen counties. Winter visitor along the California coast and in the Central and Imperial valleys.	Winter Visitor. May forage in wet meadows in the project area.
Yellow-billed cuckoo *Coccyzus americanus*	FC, BCC CE	Inhabits extensive deciduous riparian thickets or forests with dense, low-level or understory foliage, and which abut on slow-moving watercourses, backwaters, or seeps. Willow almost always a dominant component of the vegetation.	Unlikely to occur. Project is located outside of species' known distribution.
Western burrowing owl *Athene cunicularia*	BCC CSC (Burrow sites.)	Open, dry annual or perennial grasslands, deserts, and scrublands characterized by low-growing vegetation. Subterranean nester, dependent upon burrowing mammals, most notably the California ground squirrel.	Unlikely to occur. Project is located outside of species' known distribution.

Name	Status	Habitat	Potential Occurrence
Vaux's swift *Chaetura vauxi*	– CSC (nesting)	Prefers redwood and Douglas fir habitats with nest sites in large, hollow trees and snags, especially tall, burned-out stubs. Forages over moist terrain and habitats, preferring rivers and lakes.	Unlikely to occur. Project is located outside of species' known distribution.
Black swift *Cypseloides niger*	BCC CSC (nesting)	Breeds locally in Sierra Nevada and Cascades. Nests in moist crevices or caves, or on cliffs near waterfalls in deep canyons. Forages widely over many habitats; seems to avoid arid regions.	Unlikely to occur. Project is located outside of species' known distribution.
Lewis' woodpecker *Melanerpes lewis*	BCC (nesting)	Winter resident in open oak savannas, broken deciduous, and coniferous habitats with brushy understory. Uses logged and burned areas. Winters in the Central Valley, Modoc Plateau, and the Transverse and other ranges in Southern California. Breeds locally along eastern slopes of the Coast Ranges, and in Sierra Nevada, Warner Mts., Klamath Mts., and in the Cascade Range.	Winter Visitor. May forage in the project area.
Little willow flycatcher *Empidonax traillii brewsteri*	– CE (nesting)	Wet meadow and montane riparian habitats from 2,000 to 8,000 feet. Breeding seldom occurs below 5,000 feet. Most often occurs in broad, open river valleys or large mountain meadows with lush growth of shrubby willows	Unlikely to occur. Project is located outside of species' known distribution.
Bank swallow *Riparia riparia*	– CT (nesting)	Migrant found primarily in riparian and other lowland habitats in California west of the deserts. Requires vertical banks and cliffs with fine-textured or sandy soils near streams, rivers, ponds, lakes, and the ocean for nesting. Feeds primarily over riparian areas during breeding season and over grassland and cropland during migration.	Unlikely to occur. Project is located outside of species' known distribution.
Yellow warbler (nesting) *Dendroica petechia brewsteri*	– CSC	Uncommon nester over most of California, except the Central Valley, Mojave Desert, and high elevations of the Sierra. Winters along the lower Colorado River and in parts of Imperial and Riverside counties. Nests in riparian habitats dominated by willows, cottonwoods, sycamores, or alders or in mature chaparral. May also use oaks, conifers, and urban areas nears streams.	May occur in woodland and riparian habitats in the project area

Name	Status	Habitat	Potential Occurrence
Yellow-breasted chat (nesting) *Icteria virens*	– CSC	Uncommon migrant in California. Nests in a few locations such as Sweetwater and Weber Creeks, El Dorado County; Pit River, Shasta County; Russian River, Sonoma County; Little Lake Valley, Mendocino County; and upper Putah Creek, Yolo County. Nests in dense riparian habitats dominated by willows, alders, Oregon ash, tall weeds, blackberry, and grape.	May occur in woodland and riparian habitat in the project area. Documented nesting at Little Wolf Creek, Bear River, Dry Creek, Indian Springs Creek, Deer Creek, and the Middle and South Yuba River (Nevada Co. Planning Dept. 2002).
Modesto song sparrow *Melospiza melodia mailliardi*	– CSC	Found in a variety of habitats including: riparian willow thickets, valley oak riparian with an understory of blackberry, ruderal areas along levees and irrigation canals, and cattail and tule marshes.	May occur in riparian habitats in the project area. Known to occur in western Placer County and adjacent Sierra foothill counties (Grinnell and Miller 1944; Gardali 2002).
Grasshopper sparrow *Ammodramus savannarum*	– CSC	Occurs in dry, dense grasslands, especially those with a variety of grasses and tall forbs and scattered shrubs for singing perches	May occur irregularly in non-native grasslands in the project area. One singing male was found in an annual grassland east of Lincoln; it was only present for a few days (April 1999). A fall migrant was found along Brewer Road (September 1999). (Easterla pers. comm.; Webb 2003.)
Tricolored blackbird *Agelaius tricolor*	BCC CSC (nesting colony)	Breeds near freshwater, preferably in emergent wetland with tall dense cattails or tules, but also in thickets of willow, blackberry, wild rose, and tall herbs. Feeds in grassland and cropland habitats. Found throughout the Central Valley and on the coast.	May forage in non-native grasslands and next in some raw water storage facilities.
Lawrence's goldfinch *Carduelis lawrencei*	BCC	Occurs in valley foothill hardwood and valley foothill hardwood-conifer. Breeds in open oak or other arid woodland and chaparral, near water.	May occur in woodland habitats in the project area.
Loggerhead shrike *Lanius ludovicianus*	– CSC (nesting)	Open habitats with sparse shrubs and trees (or other suitable perch sites) and bare ground and/or low, sparse herbaceous cover; oak woodlands for nesting. Found in lowlands and foothills throughout California	May forage in non-native grasslands and nest in woodland habitats in the project area.
Mammals			
Spotted bat *Euderma maculatum*	– CSC	Habitats range from arid deserts and grasslands through mixed conifer forests up to 10,600 feet in southern California. Prefers sites with adequate roosting habitat, such as cliffs. Often limited by the availability of cliff habitat. Feeds over water and along marshes.	May roost or forage in the project area in all habitat types, but project area outside of species' historic range.

Name	Status	Habitat	Potential Occurrence
Greater western mastiff bat *Eumops perotis californicus*	– CSC	Occurs in many open, semi-arid to arid habitats, including conifer and deciduous woodlands, coastal scrub, annual and perennial grasslands, chaparral, desert scrub, and urban areas in southeastern San Joaquin Valley and Coastal Ranges from Monterey County south. Typically roosts in caves, crevices or other rock formations. Requires open areas for foraging.	Unlikely to occur. Project area is outside of species' known distribution.
Townsend's big-eared bat *Corynorhinus townsendii*	– CSC	Occurs from low desert to mid-elevation montane habitat. Occurs in rural settings, inland deserts, coastal redwoods, oak woodland of the inner Coast Range and Sierra, and low to mid-elevation mixed forest.	May roost or forage in the project area in all habitat types, but project area outside of species' historic range.
Status Codes			
Federal FE = Federally listed as Endangered FT = Federally listed as Threatened = Federal Species of Concern FC = Federal Candidate species FPT = Federally Proposed Threatened BCC = Birds of Conservation Concern		State CE = California listed as Endangered CT = California listed as Threatened CR = California listed as Rare CSC = California Species of Concern CFP = California Fully Protected	

Status and habitat information is taken from California Natural Diversity Database (CDFG 2004), Zeiner et al. (1990), and USFWS Official Species List

[1] Based on table presented in the Lincoln Area Water Treatment Plant Planning and Site Study (NID 2005). Updated by Robertson-Bryan, Inc. for internal use only by NID (August 2009).

Historic and Tribal/Cultural Resources

NID has a variety of historic, tribal, and cultural resources of value to the District. These historic and cultural resources parallel that of Placer County as a whole. Information can be found in Section 4.3.1 of the Base Plan.

Growth and Development Trends

General growth in the District parallels that of the Placer County Planning Area as a whole. Information can be found in Section 4.3.1 of the Base Plan. Domestic water service with the District's service area boundary in the North Auburn area has increased by roughly 40 connections in the last 5 years. Irrigation water service has increase by 180 customers in the 5 year window. A majority of future residential developments within Placer County will occur outside the District's service area boundary.

Development since 2016

In March 2021, the District completed the Combie Phase 1, the main water supply artery into Placer County. In addition, the District has expanded its domestic water supply distribution system into the Placer County

Government Center to support future water needs. The District has annexed 11 parcels in its internal boundary who are eligible to receive irrigation water as feasible.

Future Development

The District has no control over future development in areas the District services. Future development in these areas parallels that of the Placer County Planning Area. The District relies on the city and county planning departments to establish future growth areas. The Districts reviews each growth or building project to assess water supply availability and determine the amount of water needed during drought. More general information on growth and development in Placer County as a whole can be found in "Growth and Development Trends" in Section 4.3.1 Placer County Vulnerability and Assets at Risk of the Base Plan.

J.5.3. Vulnerability to Specific Hazards

This section provides the vulnerability assessment, including any quantifiable loss estimates, for those hazards identified above in Table J-3 as high or medium significance hazards. Impacts of past events and vulnerability of the District to specific hazards are further discussed below (see Section 4.1 Hazard Identification in the Base Plan for more detailed information about these hazards and their impacts on the Placer County Planning Area). Methodologies for evaluating vulnerabilities and calculating loss estimates are the same as those described in Section 4.3 of the Base Plan.

An estimate of the vulnerability of the District to each identified priority hazard, in addition to the estimate of likelihood of future occurrence, is provided in each of the hazard-specific sections that follow. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on past occurrences, spatial extent, and damage and casualty potential. It is categorized into the following classifications:

- **Extremely Low**—The occurrence and potential cost of damage to life and property is very minimal to nonexistent.
- **Low**—Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.
- **Medium**—Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.
- **High**—Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have occurred in the past.
- **Extremely High**—Very widespread with catastrophic impact.

Depending on the hazard and availability of data for analysis, this hazard specific vulnerability assessment also includes information on values at risk, critical facilities and infrastructure, populations at risk, and future development.

Agriculture Pests and Disease

Likelihood of Future Occurrence–Occasional
Vulnerability–Medium

Hazard Profile and Problem Description

The Nevada Irrigation District (NID) is preparing its 2020 Agricultural Water Management Plan (AWMP) and 2020 Urban Water Management Plan (UWMP) due to the State of California, Department of Water Resources in 2021. Because NID is both a municipal drinking water supplier and an agricultural raw water supplier it submits both documents to the State Department of Water Resources (DWR) every five years. These plans contain pertinent information regarding agriculture and water supply and will be available on the NID website after they are finalized at https://www.nidwater.com/ag-urban-water-management-plans.

The NID service area covers the Sierra Nevada foothills, which is very different than agricultural areas in the Sacramento and San Joaquin Valleys. The service area topography contains many sloped areas with rock outcroppings, as well as less sloped areas better suited for pasture, orchards, and row crops. The foothill area contains numerous fractured rock systems that allow for private wells, but also complicate the ability to understand and quantify percolation and subsurface systems. Soil types, infiltration rates, and water holding capacities vary widely from a clay dominant soil type to a sandy, alluvial soil type in valley areas.

Summers are generally dry with mild to hot temperatures. Winters are relatively wet, especially in the upper elevations around Nevada City and Grass Valley, with snow levels usually around 3,500 ft and occasionally as low as 1,000 ft. Based on the historical data obtained from the California Irrigation Management Information System (CIMIS) and the Western Regional Climate Center (WRCC), the District's service area's average minimum and maximum monthly temperatures range from 26.4 to 92.5 degrees Fahrenheit.

Location and Extent

The gross acreage of the NID jurisdictional area is 287,000 acres which includes portions of Nevada, Placer and Yuba counties, of which approximately 32,000 acres is irrigated agriculture. These areas are typically in the lower elevation of the District, in the Sierra Nevada Foothills. About ninety percent of all the water delivered by NID is for agricultural use in Nevada and Placer Counties. Most agricultural water customers purchase water seasonally, from mid-April through mid-October. Over the past five years, the District averaged approximately 20 new agricultural customers per year. The District delivers approximately 110,000 Acre Feet of irrigation water annually.

There are multiple crops within the District's service area that vary due to topographical, geological, climatic, and soil condition differences. NID surveys its agriculture customers annually to inventory the type and approximate acreage of crops cultivated by their customers. NID checks the reported value against past reports, but does not verify and validate every report. The customer-provided crop data is in NID's 2020 AWMP Public Draft Crop Reports. Information from the reports is provided to the California State Water Resources Control Board with the District's annual water rights filings. Of the 32,000 acres of irrigated lands, approximately 20,000 acres are irrigated pasture, and family farms, forage, fruit crops and nuts comprise the majority of the remaining acres. Each crop type has a different consumptive use rate, and crops that are more temperature sensitive and vulnerable to climate change will likely require additional irrigation or an extended irrigation season.

NID's water management facilities include storage, treatment, and conveyance facilities. The District operates and maintains nine reservoirs with a combined storage total of 280,085 acre-feet (AF). The two major distribution and storage systems within the District are the Deer Creek System and the Bear River System. These systems are a mixture of canals, siphons, pipelines, and other water conveyance structures. The system is supplied by diverting NID's surface water rights into the canals at either reservoirs or at other diversion facilities located on the streams. Typical canal operations divert enough flow to allow the purchased deliveries to each customer on the canal. To maintain proper flow rates through customer delivery points, the water surface in the canal is maintained at certain levels, as is typical for miner's inch delivery systems. However, this also results in water exiting the canal at the downstream terminus. Many of these spills are then captured again at the next downstream diversion point for another canal.

Past Occurrences

There are no current state or federal disasters in Placer County related to agriculture, however planning scenarios should include a worst case event as impacts associated with climate change and elevated drought risks can trigger disease and pest outbreaks. Although outside of the NID irrigation district area, there are current threats and agricultural concerns that managers and farmers are responding to. For instance, as of July 2017, 200 square miles in south Placer County are under a citrus quarantine after the discovery of the psyllids in western Lincoln in September 2016, and single psyllid in Roseville in June 2017. The found psyllids did not test positive for the disease, but as a precautionary measure a quarantine has been put into effect for Lincoln, a significant portion of Roseville and portions of Rocklin and Granite Bay. (https://www.placer.ca.gov/1554/Mandarin-Threat).

Vulnerability to and Impacts from Agriculture Pests and Disease

According to the USDA, every year natural disasters, such as droughts, extreme heat and cold, floods, fires, hail, landslides, and tornadoes, challenge agricultural production. Because agriculture relies on the weather, climate, and water availability to thrive, it is easily impacted by natural events and disasters. Agricultural impacts from natural events and disasters most commonly include contamination of water bodies, loss of harvest or livestock, increased susceptibility to disease, and destruction of irrigation systems and other agricultural infrastructure. These impacts can have long lasting effects on agricultural production including crops, forest growth, and arable lands, which require time to mature. More specific impacts by hazard were listed in Section 4.3.6 of the Base Plan.

In addition to threats to agriculture from weather and other natural hazard events, agriculture in the County is at risk from insects, pests, and noxious weeds. Establishment of an invasive species would be detrimental to the agricultural industry of Placer County because of product losses, stringent quarantine regulations, loss of exporting opportunities and increased treatment costs. The introduction of exotic plants influences wildlife by displacing forage species, modifying habitat structure—such as changing grassland to a forb-dominated community—or changing species interactions within the ecosystem.

In addition, invasive weeds can increase fire risk in the County.

Assets at Risk

NID does not own agricultural lands, however it does provide water for irrigation in Placer County. Due to the potential for widespread impacts, specific agricultural hazards associated with climate and water availability may have significant impacts that are widespread in the region. The potential for these impacts is correlated with climate change and local climate factors, as well as natural cycles of disease and pests. According to Placer County data, approximately 11% of employment is attributed to agriculture in Placer County, with significant growth in small farms and the "farm to fork" operations.

The potential for damages and interruptions within this water system are associated with the terrain that the canals and reservoirs flow through and associated potential for drought, wildfire, landslides, flooding, hazardous trees and anthropogenic disturbance. The District's water supplies are very vulnerable to drought and are expected to be further impacted by climate change. The supply system relies on spring and summer snow melt runoff, as well as capture and storage in reservoirs to release during the irrigation season. During droughts and periods of warmer winters when there is less snowpack, runoff is reduced, and the District must manage its storage and customer demands to meet requirements. The most prominent and obvious cause for the fluctuation in natural runoff is the variability in hydrologic conditions, as seen in the wide variations in annual rainfall/snowpack accumulations. The supply availability reduction is dependent on the severity and length of the drought. In addition to the hydrologic impacts on NID's supplies, there can also be regulatory reduction as well, as during the last drought the State mandated supply curtailments and NID was not able to access its available supply.

Avalanche

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

According to the Sierra Avalanche Center, avalanches occur when loading of new snow increases stress at a rate faster than strength develops, and the slope fails. Avalanches are a rapid down-slope movement of snow, ice and debris triggered by ground shaking, sound, or human or animal movement. Avalanches consist of a starting zone where the ice or snow breaks loose, a track which is the grade or channel the debris slides down and a run-out zone where the snow is deposited.

Critical stresses develop more quickly on steeper slopes and where deposition of wind-transported snow is common. The vast majority of avalanches occur during and shortly after storms. This hazard generally affects a small number of people, such as snowboarders, skiers, and hikers who venture into backcountry areas during or after winter storms. Road and highway closures, damaged structures and critical infrastructure, and destruction of forests are also a direct result of avalanches.

Location and Extent

The two primary factors impacting avalanche activity are weather and terrain. Large, frequent storms deposit snow on steep slopes to create avalanche hazards. Additional factors that contribute to slope stability are the amount of snow, rate of accumulation, moisture content, wind speed and direction and type

of snow crystals. Topography also plays a vital role in avalanche dynamics. Slope angles between 30 to 45 degrees are optimal for avalanches. The risk of avalanches decreases on slope angles below 30 degrees. At 50 or more degrees they tend to produce sluff or loose snow avalanches that account for only a small percentage of avalanche deaths and property damage annually.

Areas prone to avalanche hazards include hard to access areas deep in the backcountry and those in the more developed higher elevations of the County in the Tahoe basin. Avalanche hazards exist in eastern Placer County where combinations of the above criteria occur.

Past Occurrences

There have been no state or federal disasters in the County related to avalanche. Heavy snow in the early 1990's blocked water flow in the South Yuba Canal and created constraints on the Districts water delivery system. Emergency pumps were brought in to pump water from Scotts Flat as a backup while the snow was cleared.

Vulnerability to and Impacts from Avalanche

Avalanches occur when the weight of new snow increases stress faster than strength of the snowpack develops, causing the slope to fail. Avalanche conditions develop more quickly on steeper slopes (located in the eastern portions of the County) and where wind-blown snow is common. Avalanche impacts vary, but include risk to property, injury, or death. Avalanches generally affect a few snowboarders, skiers, and hikers who venture into backcountry areas during or after winter storms. Avalanches cause road closures, and can damage structures and forests.

NID has critical water supply facilities in the high alpine watershed that supply a majority of the District's annual water needs. These facilities are located in remote, steep terrain that is subject to avalanche during heavy winters. The primary danger with an avalanche is the potential for blockage of canals and damage to the many elevated flumes relied upon for conveyance.

Heavy snow in the early 1990's blocked water flow in the South Yuba Canal and created constraints on the Districts water delivery system. Emergency pumps were brought in to pump water from Scotts Flat as a backup while the snow was cleared. The District has completed a permanent pumping facility as an emergency backup supply should future heavy snows or avalanches damage District facilities on the Nevada County branch. Most of the water supply facilities are shared between the District and PG&E. Both agencies would coordinate to facilitate necessary repairs.

Assets at Risk

An avalanche that cuts water supply from Spaulding Reservoir has the potential to affect domestic and irrigation water supplies, powerhouse generation, and have a negative effect on recreation at the local reservoirs

Climate Change

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Climate change adaptation is a key priority of the State of California. The 2018 State of California Multi-Hazard Mitigation Plan stated that climate change is already affecting California. Sea levels have risen by as much as seven inches along the California coast over the last century, increasing erosion and pressure on the state's infrastructure, water supplies, and natural resources. The State has also seen increased average temperatures, more extreme hot days, fewer cold nights, a lengthening of the growing season, shifts in the water cycle with less winter precipitation falling as snow, and earlier runoff of both snowmelt and rainwater in the year. In addition to changes in average temperatures, sea level, and precipitation patterns, the intensity of extreme weather events is also changing.

Climate models predict that the Sierra Nevada Region will experience warming average annual temperatures ranging from an increase of 2°F - 4°F in the winter and 4°F - 8°F in the summer by the end of the century. This shift to a warmer climate is expected to have wide ranging effects on the annual weather conditions, snowfall, forest health, water availability, and wildfire. One of the most concerning impacts of climate change on the District is reduced forest resilience and the projected decrease in annual snowpack accumulation due to the transition of average annual precipitation from snow to rain caused by increasing temperatures. As a headwaters region, snowpack is the largest source of storage within the NID system, and the series of reservoirs rely heavily on the timed release of water in snowpack to recharge reservoirs into the late summer when rain no longer falls. Actively managing forested landscapes can help NID address climate change impacts, prepare for the future, and reduce risks (such as wildfire ignition) that are exacerbated by a warmer climate.

Location and Extent

Climate change is a global phenomenon. It is expected to affect the whole of the District, Placer County, and State of California. There is no scale to measure the extent of climate change. Climate change exacerbates other hazards, such as drought, extreme heat, flooding, wildfire, and others. The speed of onset of climate change is very slow. The duration of climate change is not yet known, but is feared to be tens to hundreds of years.

The effects of climate change are variable across the whole of the District service area. Increasing average temperatures and a shift in winter precipitation from snow to rain will have immediate effects on the function of NID's water collection system; especially in the upper elevation snowpack. Lower elevations may see more variability in weather conditions, drought, and severe storm events which are a risk to operation and maintenance of the water system due to the unpredictability and potential to damage infrastructure.

Wildfire is one hazard that is significantly influenced by increased average temperature, drought, and excessive tree mortality impacts of climate change. All elevations of the District have the potential for severe damages in the event of a catastrophic wildfire.

Past Occurrences

Climate change has never been directly linked to any declared disasters. While the District noted that climate change is of concern, no specific impacts of climate change could be recalled. The District and HMPC members did, however, note that in Placer County, the strength of storms does seem to be increasing and the temperatures seem to be getting hotter. Hotter temperatures, combined with recent drought conditions, exacerbates the potential for damaging wildfires.

The District noted that due to the long-term nature of climate change, no one disaster can be directly attributed to climate change alone. Climate change has exacerbated many Nevada County disasters by increasing the frequency of hazardous weather conditions, decreasing snowpack, increasing the likelihood of flood, and intensifying wildfire.

Vulnerability to and Impacts from Climate Change

The California Adaptation Planning Guide (APG) prepared by California OES and CNRA was developed to provide guidance and support for local governments and regional collaboratives to address the unavoidable consequences of climate change. California's APG: Understanding Regional Characteristics has divided California into 11 different regions based on political boundaries, projected climate impacts, existing environmental setting, socioeconomic factors and regional designations. Placer County falls within the North Sierra Region characterized as a sparsely settled mountainous region where the region's economy is primarily tourism-based. The region is rich in natural resources, biodiversity, and is the source for the majority of water used by the state. This information can be used to guide climate adaptation planning in the District and Placer County Planning Area.

The California APG: Understanding Regional Characteristics identified the following impacts specific to the North Sierra region in which the Placer County Planning Area is part of:

- Temperature increases
- Decreased precipitation
- Reduced snowpack
- Reduced tourism
- Ecosystem change
- Sensitive species stress
- Increased wildfire

The direct impacts of climate change on District facilities, water conveyance system, or and operations are broad. Drought can impact stream flow, water supply, and lead to conflicts between environmental and anthropogenic uses. Increased wildfire potential, and increased burn severity can destroy infrastructure as well as have long-lasting impacts to the watersheds NID collects water resources from. Increased flows due to excessive or above average runoff can impact infrastructure designed for a historic flow regime by over topping

Assets at Risk

All District assets which are impacted by wildfire, decreased water supply, decreased snowpack, increased runoff, or excessive tree mortality and hazard trees are at risk.

Dam Failure

Likelihood of Future Occurrence–Occasional
Vulnerability–High

Hazard Profile and Problem Description

Dams are manmade structures built for a variety of uses including flood protection, power generation, agriculture, water supply, and recreation. When dams are constructed for flood protection, they are usually engineered to withstand a flood with a computed risk of occurrence. For example, a dam may be designed to contain a flood at a location on a stream that has a certain probability of occurring in any one year. If prolonged periods of rainfall and flooding occur that exceed the design requirements, that structure may be overtopped or fail. Overtopping is the primary cause of earthen dam failure in the United States.

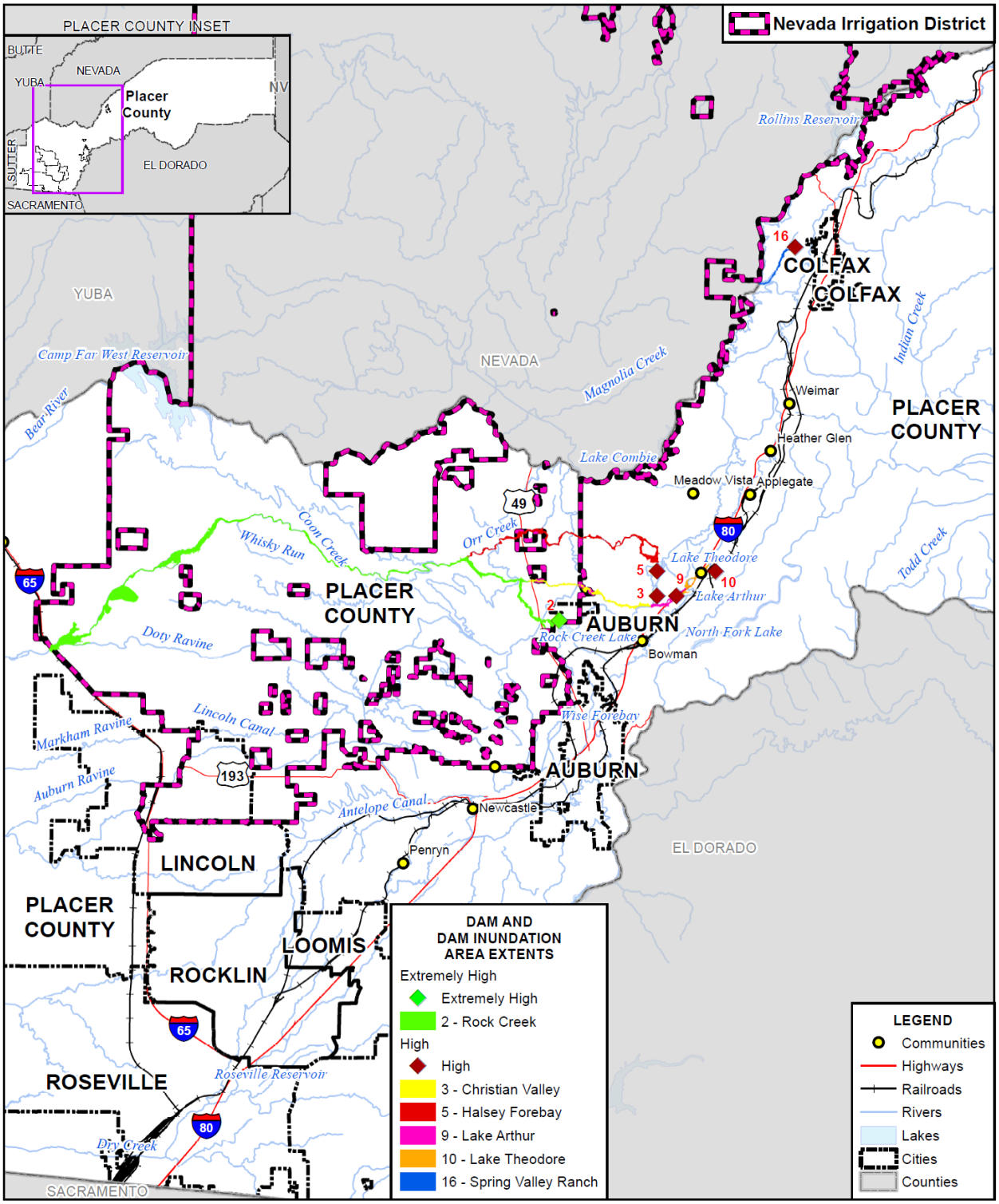
Location and Extent

Dam failure is a natural disaster from two perspectives. First, the inundation from released waters resulting from dam failure is related to naturally occurring floodwaters. Second, a total dam failure would most probably happen as a consequence of the natural disaster triggering the event, such as flooding or an earthquake. There is no scale with which to measure dam failure. However, Cal DWR Division of Safety of Dams (DOSD) assigns hazard ratings to dams within the State that provides information on the potential impact should a dam fail. The following two factors are considered when assigning hazard ratings: existing land use and land use controls (zoning) downstream of the dam. Dams are classified in four categories that identify the potential hazard to life and property: Low, Significant, High, and Extremely High. These were discussed in more detail in Section 4.3.9 of the Base Plan.

While a dam may fill slowly with runoff from winter storms, a dam break has a very quick speed of onset. The duration of dam failure is generally not long – only as long as it takes to empty the reservoir of water the dam held back. The District would be affected for as long as the flood waters from the dam failure took to drain downstream.

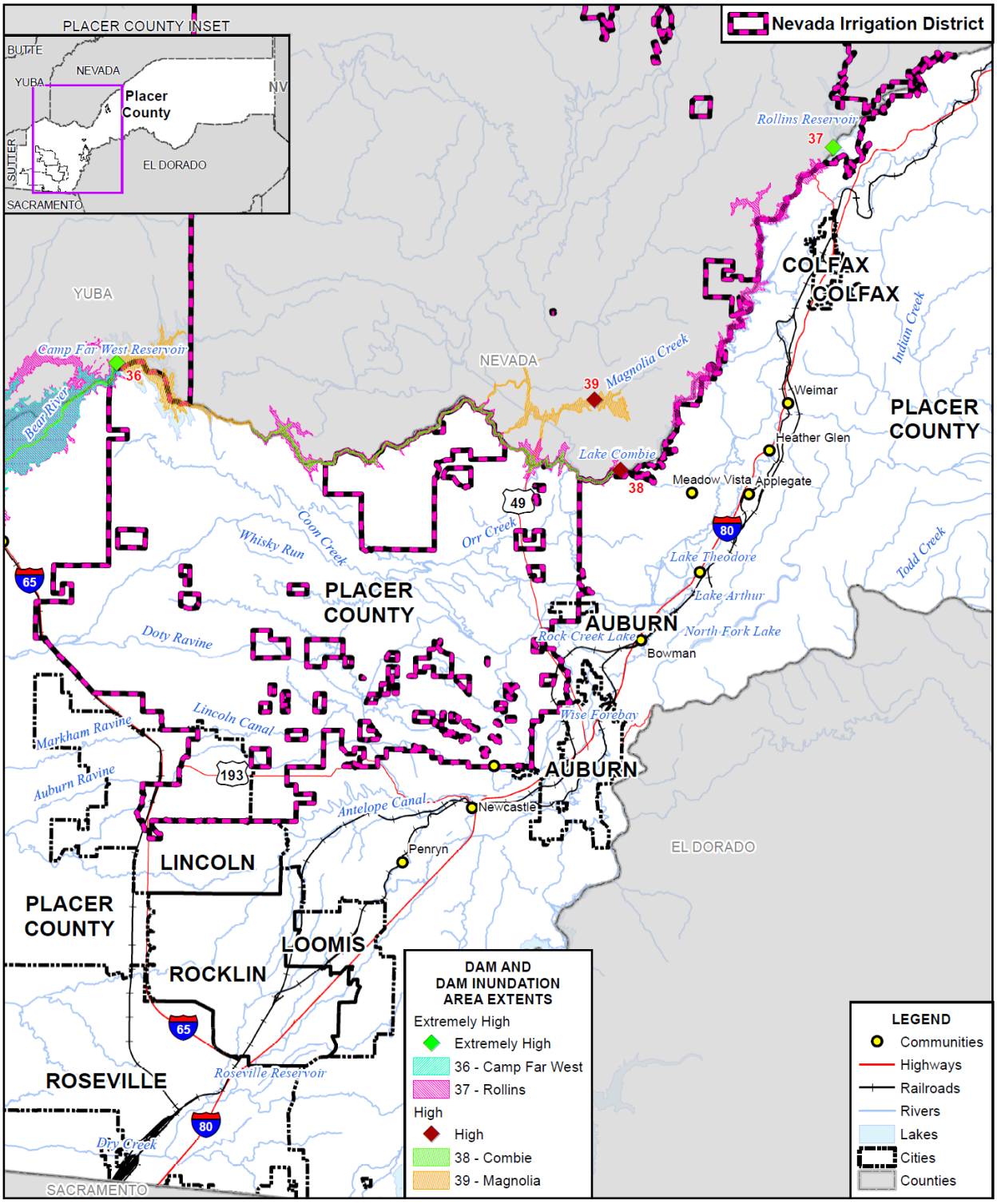
Dams inside the County that can affect the District can be seen on Figure J-2. Dams outside the County that can affect the District can be seen on Figure J-3.

Figure J-2 NID – Dam Inundation Areas from Dams Inside the County



Data Source: DWR DSOD Data 2020, Placer County GIS, Cal-Atlas, NVBLM; Map Date: 2021.

Figure J-3 NID – Dam Inundation Areas from Dams Outside the County



Data Source: DWR DSOD Data 2020, Placer County GIS, Cal-Atlas, NVBLM; Map Date: 2021.

Past Occurrences

There has been no federal or state disaster declarations for dam failure in the County. The District noted no other dam failure occurrences that have affected the District.

Vulnerability to and Impacts from Dam Failure

Dam failure flooding would vary by community depending on which dam fails and the nature and extent of the dam failure and associated flooding. Impacts to the District from a dam failure flood could include loss of life and injury, flooding and damage to property and structures, damage to critical facilities and infrastructure, loss of natural resources, and all other flood related impacts. Additionally, mass evacuations and associated economic losses can also be significant.

NID owns several dams of concern. The District's highest dam is the rock fill-earth core dam at Rollins Reservoir, built in 1965 and standing 242 feet tall. The Jackson Meadows dam (1965) is second highest at 195 feet, Bowman North Rockfill Dam is 178 feet, Scotts Flat dam (1965) is 175 feet, and the Bowman South Arch dam (1925) is 171 feet high.

French Dam, constructed in 1858-59, is the District's oldest dam still in use. Other dams that originated in the 1800s include the Bowman Rockfill dam (1872), and Faucherie, Sawmill and Jackson, all constructed prior to 1880 and have sense been entirely torn down and rebuilt at different times. In the lower division, Van Giesen Dam at Combie Reservoir is the oldest, built in 1928. Additional information related to NID's dams can be found on its website at: https://www.nidwater.com/dam-safety.

Vulnerability to dam failures is generally confined to the areas subject to inundation downstream of the facility. Based on analysis provided in the Placer County General Plan Background Report, only five dams within Placer County have the potential to affect more than 100 persons: Folsom Dikes No. 5 & 6; Lake Tahoe Dam; Camp Far West Dam; Lake Combie Dam; and Rollins Reservoir Dam. Of these five, a failure of Rollins Reservoir or Combie Dams could potentially impact areas within the NID. Failure of Dutch Flat Forebay or Afterbay could also potentially impact services provided by NID, albeit in a limited capacity.

Assets at Risk

All District assets are at risk in the event of dam failure due to the loss of water in the overall system.

Drought & Water Shortage

Likelihood of Future Occurrence–Occasional
Vulnerability–High

Hazard Profile and Problem Description

Drought is a complex issue involving many factors—it occurs when a normal amount of precipitation and snow is not available to satisfy an area's usual water-consuming activities. Drought can often be defined regionally based on its effects. Drought is different than many of the other natural hazards in that it is not a distinct event and usually has a slow onset. Drought can severely impact a region both physically and

economically. Drought affects different sectors in different ways and with varying intensities. Adequate water is the most critical issue and is critical for agriculture, manufacturing, tourism, recreation, and commercial and domestic use. As the population in the area continues to grow, so will the demand for water.

Location and Extent

Drought and water shortage are regional phenomenon. The whole of the County, as well as the whole of the District, is at risk. The US Drought Monitor categorizes drought conditions with the following scale:

- None
- D0 – Abnormally dry
- D1 – Moderate Drought
- D2 – Severe Drought
- D3 – Extreme drought
- D4 – Exceptional drought

Drought has a slow speed of onset and a variable duration. Drought can last for a short period of time, which does not usually affect water shortages, or it can last for longer periods. Should a drought last for a long period of time, water shortage becomes a larger issue. Current drought conditions in the District and the County are shown in Section 4.3.10 of the Base Plan.

Past Occurrences

There has been one state and one federal disaster declaration due to drought since 1950. This can be seen in Table J-7.

Table J-7 Placer County – State and Federal Disaster Declarations Summary 1950-2020

Disaster Type	State Declarations		Federal Declarations	
	Count	Years	Count	Years
Drought	1	2014	1	1977

Source: Cal OES, FEMA

Since drought is a regional phenomenon, past occurrences of drought for the District are the same as those for the County and includes 5 multi-year droughts over an 85-year period. Details on past drought occurrences can be found in Section 4.3.10 of the Base Plan. Specific past occurrences for the District include:

A severe drought that affected the District and all of California is the drought of **1977-1978**. This drought was severe enough to trigger implementation of the District's Drought Contingency Plan at the most restrictive level – that of mandatory rationing and reduction in service to irrigation customers up to 50%.

The 1991-1992, drought also severely impacted the District and other areas of Placer County and surrounding California foothills.

After 2 years of below-average rainfall and very low snow-melt run off, Governor Schwarzenegger in June of 2008 declared a state of emergency for drought conditions statewide. The final California Department of Water Resources showed snowpack water content at only 67 percent of normal.

The District experienced below average precipitation and minimal snowpack from 2012 to 2015 and again from 2017 to 2020. Current precipitation conditions are below average as well. In 2014 the District recorded a snowpack reading of 5% of average, the lowest snowpack reading since it began collecting this data in 1921. Governor Brown declared a state of emergency and the State Water Resources Control Board restricted water use and curtailed many of the Districts water rights. The limited water supply along with the States mandated actions necessitated the enactment of the Districts Drought Contingency Plan. Mandatory reductions of 36% were required for all treated water customers, while ag water customers provided voluntary cutbacks. Throughout the drought, the District proactively managed its water resources during the dry years through conservation and careful water management. The District also purchased supplemental waters from neighboring agencies to help bolster supply.

Vulnerability to and Impacts from Drought and Water Shortage

Based on historical information, the occurrence of drought in California, including the District, is cyclical, driven by weather patterns. Drought has occurred in the past and will occur in the future. However, climate change impacts are trending towards more variable weather events, and therefore, unpredictability of drought. Periods of actual drought with adverse impacts can vary in duration, and the period between droughts can be extended. Although an area may be under an extended dry period, determining when it becomes a drought is based on impacts to individual water users. Drought impacts are wide-reaching and may be economic, environmental, and/or societal. Tracking drought impacts can be difficult.

The most significant qualitative impacts associated with drought in the Placer County Planning Area are those related to water intensive activities such as agriculture, wildfire protection, municipal usage, commerce, tourism, recreation, and wildlife preservation. Mandatory conservation measures are typically implemented during extended droughts. Drought conditions can also cause soil to compact and not absorb water well, potentially making an area more susceptible to flooding. With a reduction in water, water supply issues based on water rights becomes more evident. Climate change may create additional impacts to drought and water shortage in the County and the District.

During periods of drought, vegetation can dry out which increases fire risk. Drought that occurs during periods of extreme heat and high winds can cause Public Safety Power Shutoff (PSPS) events to be declared in the County. More information on power shortage and failure can be found in the Severe Weather: Extreme Heat Section below, as well as in Section 4.3.2 of the Base Plan.

With the unknowns of drought and globally changing climate conditions, NID, more than ever, is promoting water conservation and expansion of storage.

Continued prolonged drought would be detrimental to the District's finances. As people are asked to conserve, water use reduced, resulting in decreased revenue. Additionally, during drought, the District purchases supplemental water supplies to bolster reservoir storage. The expense of purchasing water can eclipse 2.5 million dollars.

Assets at Risk

The main asset at risk during drought is the financial health of the District. The loss of water sales in combination with additional water purchases expenses is detrimental to the Districts funds. In addition, District hydroelectric powerhouses would be shut down due to limited natural flows, thus providing another hit to District finance via loss of power generation.

Earthquake

Likelihood of Future Occurrence–Occasional
Vulnerability–Medium

Hazard Profile and Problem Description

An earthquake is caused by a sudden slip on a fault. Stresses in the earth's outer layer push the sides of the fault together. Stress builds up, and the rocks slip suddenly, releasing energy in waves that travel through the earth's crust and cause the shaking that is felt during an earthquake. Earthquakes can cause structural damage, injury, and loss of life, as well as damage to infrastructure networks, such as water, power, gas, communication, and transportation. Earthquakes may also cause collateral emergencies including dam and levee failures, seiches, hazmat incidents, fires, avalanches, and landslides. The degree of damage depends on many interrelated factors. Among these are: the magnitude, focal depth, distance from the causative fault, source mechanism, duration of shaking, high rock accelerations, type of surface deposits or bedrock, degree of consolidation of surface deposits, presence of high groundwater, topography, and the design, type, and quality of building construction.

Location and Extent

The amount of energy released during an earthquake is usually expressed as a magnitude and is measured directly from the earthquake as recorded on seismographs. An earthquake's magnitude is expressed in whole numbers and decimals (e.g., 6.8). Seismologists have developed several magnitude scales, as discussed in Section 4.3.11 of the Base Plan. Placer County itself is traversed by a series of northwest-trending faults, called the Foothill Fault Zone, that are related to the Sierra Nevada uplift. This was the source of Oroville's 1975 earthquake (and an earlier event in the 1940s). Subsequent research of these events led to the identification and naming of the zone and questions about the siting and design of the proposed Auburn Dam. Earthquakes on nearby fault segments in the zone could be the source of ground shaking in the Placer County Planning Area.

Although portions of western and eastern Placer County are located in a seismically active region, no known faults actually go through any of the cities or towns. However, the Bear Mountain and the Melones faults are situated approximately three to four miles west and east of the City of Auburn respectively. Earthquakes on these two faults would have the greatest potential for damaging buildings in Auburn, especially the unreinforced masonry structures in the older part of the city and homes built before 1960 without adequate anchorage of framing and foundations. Similar lower magnitude but nearby earthquakes are capable of producing comparable damages in other Placer County communities.

Another measure of earthquake severity is intensity. Intensity is an expression of the amount of shaking at any given location on the ground surface. Seismic shaking is typically the greatest cause of losses to structures during earthquakes. Seismic shaking maps for the area show Placer County and the District fall within a low to moderate shake risk.

Past Occurrences

There have be no past federal or state disaster declarations from this hazard. The District noted no past occurrences of earthquakes or that affected the District in any meaningful way.

Vulnerability to and Impacts from Earthquake

The combination of plate tectonics and associated California coastal mountain range building geology generates earthquake as a result of the periodic release of tectonic stresses. Placer County lies in the center of the North American and Pacific tectonic plate activity. There have been earthquakes as a result of this activity in the historic past, and there will continue to be earthquakes in the future of the California north coastal mountain region.

Fault ruptures itself contributes very little to damage unless the structure or system element crosses the active fault; however, liquefaction can occur further from the source of the earthquake. In general, newer construction is more earthquake resistant than older construction due to enforcement of improved building codes. Manufactured buildings can be very susceptible to damage because their foundation systems are rarely braced for earthquake motions. Locally generated earthquake motions and associated liquefaction, even from very moderate events, tend to be more damaging to smaller buildings, especially those constructed of unreinforced masonry (URM) and soft story buildings.

The Uniform Building Code (UBC) identifies four seismic zones in the United States. The zones are numbered one through four, with Zone 4 representing the highest level of seismic hazard. The UBC establishes more stringent construction standards for areas within Zones 3 and 4. All of California lies within either Zone 3 or Zone 4. The NID is within the less hazardous Zone 3.

Impacts from earthquake in the District will vary depending on the fault that the earthquake occurs on, the depth of the earthquake strike, and the intensity of shaking. Large events could cause damages to infrastructure, critical facilities, residential and commercial properties, and possible injuries or loss of life.

Earthquake vulnerability for the District lies in the water delivery infrastructure and not in its buildings. Earthquakes can cause a separation of underground water supply mains causing flooding and ultimately leading to water supply interruptions.

Earthquakes also have the potential to cause failures of the canal berm/leave system and cause flooding and supply water interruptions.

Additionally, the District is responsible for multiple water storage dams that are susceptible to damage and potentially major flooding during a large earthquake event. The Districts Dam facilities are under the jurisdiction of the CA Department of Dam Safety and the Federal Energy Regulatory Commission which require adherence to a strict set of safety guidelines and Dam safety protocol.

Assets at Risk

A strong earthquake has the potential to cause damage to nearly all District facilities.

Flood: 1%/0.2% Annual Chance

Likelihood of Future Occurrence–Occasional/Unlikely
Vulnerability–High

Hazard Profile and Problem Description

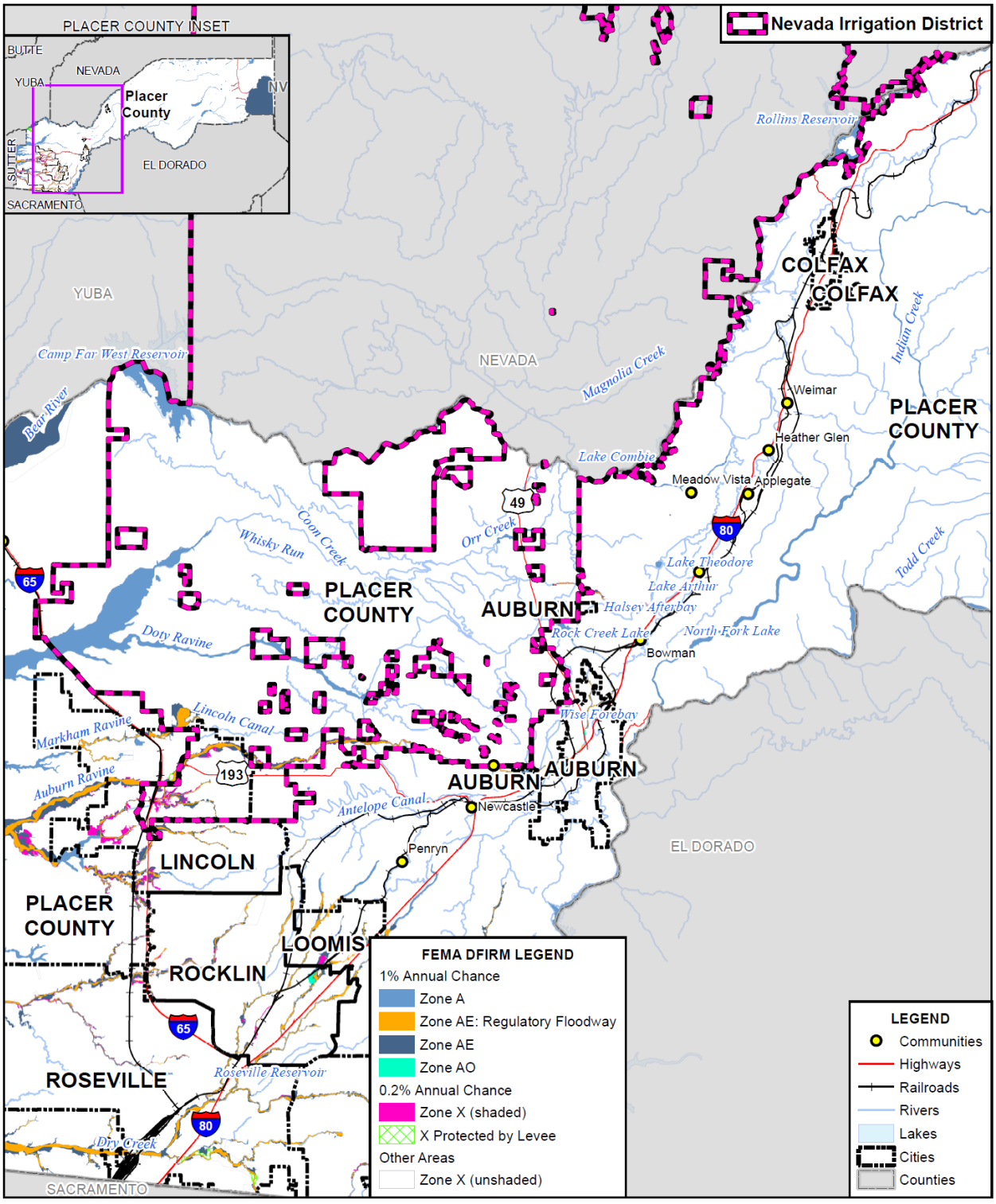
This hazard analyzes the FEMA DFIRM 1% and 0.2% annual chance floods. These tend to be the larger floods that can occur in the County or in the District, and have caused damages in the past. Flooding is a significant problem in Placer County and the District. Historically, the District has been at risk to flooding primarily during the winter and spring months when river systems in the County swell with heavy rainfall and snowmelt runoff. Normally, storm floodwaters are kept within defined limits by a variety of storm drainage and flood control measures. Occasionally, extended heavy rains result in floodwaters that exceed normal high-water boundaries and cause damage.

As previously described in Section 4.3.12 of the Base Plan, the Placer County Planning Area and the NID have been subject to historical flooding.

Location and Extent

The NID has areas located in the 1% and 0.2% annual chance floodplain. This is seen in Figure J-4.

Figure J-4 NID – FEMA DFIRM Flood Zones



Data Source: FEMA DFIRM 11/2/2018, Placer County GIS, Cal-Atlas, NVBLM; Map Date: 2021.

Table J-8 details the DFIRM mapped flood zones within the 1% annual chance flood zone as well as other flood zones located within the District.

Table J-8 NID– DFIRM Flood Hazard Zones

Flood Zone	Description	Flood Zone Present in the District
A	Areas subject to inundation by the 1% annual-chance flood event generally determined using approximate methodologies. Because detailed hydraulic analyses have not been performed, no Base Flood Elevations (BFEs) or flood depths are shown. Mandatory flood insurance purchase requirements and floodplain management standards apply.	X
AE	Areas subject to inundation by the 1% annual-chance flood event determined by detailed methods. Base Flood Elevations (BFEs) are shown. Mandatory flood insurance purchase requirements and floodplain management standards apply.	X
AE – Regulatory Floodway	Areas subject to inundation by the 1% annual-chance flood event determined by detailed methods. Base Flood Elevations (BFEs) are shown. Mandatory flood insurance purchase requirements and floodplain management standards apply. Different from AE in that it adds the water course and adjacent lands that must be reserved in order to discharge the base flood without increasing the water surface elevation by more than one foot.	
AH	An area inundated by 1% annual chance flooding (usually an area of ponding), for which BFEs have been determined; flood depths range from 1 to 3 feet	
AO	Areas subject to inundation by 100-year shallow flooding (usually sheet flow on sloping terrain) where average depths are between one and three feet	
Shaded X	500-year flood the areas between the limits of the 1% annual chance flood and the 0.2-percent-annual-chance (or 500-year) flood	X
X Protected by Levee	An area determined to be outside the 500-year flood and protected by levee from 100-year flood	
X	Areas outside of known floodplains.	X

Source: FEMA

Additionally, flood extents can generally be measured in volume, velocity, and depths of flooding. Expected flood depths in the District vary, depending on the nature and extent of a flood event; specific depths are unknown. Flood durations in the District tend to be short to medium term, or until either the storm drainage system can catch up or flood waters move downstream. Flooding in the District tends to have a shorter speed of onset, due to the amount of water that flows through the District.

Past Occurrences

A list of state and federal disaster declarations for Placer County from flooding is shown on Table J-9. These events also likely affected the District to some degree.

Table J-9 Placer County – State and Federal Disaster Declarations from Flood 1950-2020

Disaster Type	Federal Declarations		State Declarations	
	Count	Years	Count	Years
Flood (including heavy rains and storms)	16	1950, 1955, 1958 (twice), 1962, 1963, 1969, 1973, 1980, 1983, 1986, 1995 (twice), 1997, 2008, 2017	13	1955, 1958, 1962, 1964, 1969, 1983, 1986, 1995 (twice), 1997, 2006 (twice), 2017

Source: Cal OES, FEMA

Heavy prolong precipitation in late 1996 caused flood damage across much of the District's service area. President Clinton proclaimed the area a disaster area while Governor Wilson followed suit. Many of the Districts main diversion dams and canals were washed out. Over 50 applications for flood damage assistance for the repair of NID facilities were submitted to FEMA and Cal OES.

Another flood event to impact the District is the late December floods of 2005. Excessive rain for a prolonged period caused severe flooding in the Sierra foothills, in and around Placer County. Impacts included damage to the District's canal system as well as damage to roads and properties throughout District boundaries.

Vulnerability to and Impacts from Flood

Floods have been a part of the District's historical past and will continue to be so in the future. During winter months, long periods of precipitation and the timing of that precipitation are critical in determining the threat of flood, and these characteristics further dictate the potential for widespread structural and property damages. Predominantly, the effects of flooding are generally confined to areas near the waterways of the County. As waterways grow in size from local drainages, so grows the threat of flood and dimensions of the threat. This threatens structures in the floodplain. Structures can also be damaged from trees falling as a result of water-saturated soils. Electrical power outages happen, and the interruption of power causes major problems. Loss of power is usually a precursor to closure of governmental offices and community businesses. Roads can be damaged and closed, causing safety and evacuation issues. People may be swept away in floodwaters, causing injuries or deaths.

Floods are among the costliest natural disasters in terms of human hardship and economic loss nationwide. Floods can cause substantial damage to structures, landscapes, and utilities as well as life safety issues. Floods can be extremely dangerous, and even six inches of moving water can knock over a person given a strong current. During a flood, people can also suffer heart attacks or electrocution due to electrical equipment short outs. Floodwaters can transport large objects downstream which can damage or remove stationary structures. Ground saturation can result in instability, collapse, or other damage. Objects can also be buried or destroyed through sediment deposition. Floodwaters can also break utility lines and interrupt services. Standing water can cause damage to crops, roads, foundations, and electrical circuits. Direct impacts, such as drowning, can be limited with adequate warning and public education about what to do during floods. Other problems connected with flooding and stormwater runoff include erosion, sedimentation, degradation of water quality, loss of environmental resources, and economic impacts.

Flooding and soil erosion due to heavy rains and snow runoff have been a historical problem throughout Placer County. Abundant snowfall in the mountains combined with rain and steep terrain can mean rapid runoff and flooding. Water flow can be high in peak runoff periods with historical downstream flooding. The primary impacts from flooding within the District include damage to roads, utilities, bridges; and flooding of homes, businesses and critical facilities. Flooding has also caused canals to overtop and erosion of the canal levees.

Assets at Risk

All District assets are potentially at low risk of this hazard.

Flood: Localized Stormwater Flooding

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Flooding occurs in areas other than the FEMA mapped 1% and 0.2% annual chance floodplains. Flooding may be from drainages not studied by FEMA, lack of or inadequate drainage infrastructure, or inadequate maintenance. Localized, stormwater flooding occurs throughout the County during the rainy season from November through April. Prolonged heavy rainfall contributes to a large volume of runoff resulting in high peak flows of moderate duration.

Location and Extent

The NID is subject to localized flooding throughout the District. The Districts treated water system is susceptible to localized flooding damages from concentrated storm water runoff causing erosion of soil and exposing the water main. The exposed water main is then weekend and vulnerable to breakage due to the loss of securing soils. Treated water pipelines also have the potential to cause localized flooding during water main breaks. The District's canal systems are subject inundation and overtopping during a localized flood event. The overtopping can lead to property damages.

Flood extents are usually measured in areas affected, velocity of flooding, and depths of flooding. Expected flood depths in the District vary by location. Flood durations in the District tend to be short to medium term, or until either the storm drainage system can catch up or flood waters move downstream. Localized flooding in the District tends to have a shorter speed of onset, especially when antecedent rainfall has soaked the ground and reduced its capacity to absorb additional moisture.

Past Occurrences

There have been no federal or state disaster declarations in the County due to localized flooding. Past flooding incidents, although minor in scope, have occurred on nearly every District canal. Occasionally the District will receive a claim for localized flooding of property due to an overtop in a canal from heavy rains. The District experiences on average ten to twenty of these types of claims annually.

Vulnerability to and Impacts from Localized Flooding

Historically, much of the growth in the District and County has occurred adjacent to streams, resulting in significant damages to property, and losses from disruption of community activities when the streams overflow. Additional development in the watersheds of these streams affects both the frequency and duration of damaging floods through an increase in stormwater runoff.

Primary concerns associated with stormwater flooding include life safety issues, and impacts to property and to infrastructure that provides a means of ingress and egress throughout the community. Ground saturation can result in instability, collapse, or other damage to trees, structures, roadways and other critical infrastructure. Objects can also be buried or destroyed through sediment deposition. Floodwaters can break utility lines and interrupt services. Standing water can cause damage to crops, roads, and foundations. Other problems connected with flooding and stormwater runoff include erosion, sedimentation, degradation of water quality, losses of environmental resources, and certain health hazards.

NID supplies both drinking and irrigation water to portions of Placer County. The conveyance of water is accomplished through over 400 miles of pipe and nearly 500 miles of open canal. Both the water pipelines and canal facilities are subject to damages from localized flooding.

The District's treated water system is susceptible to localized flooding damages from concentrated storm water runoff causing erosion of soil and exposing the water main. The exposed water main is then weekend and vulnerable to breakage due to the loss of securing soils. Treated water pipelines also have the potential to cause localized flooding during water main breaks.

The District performs ongoing canal rehabilitation to fortify facilities to bolster against storm water infiltration. In addition, the District has finished the replacement of the Combie Ophir 1 canal, a major water delivery system to Placer County.

Assets at Risk

The Districts canal water systems as well as the domestic water supply systems are assets that are most vulnerable to localized flooding.

Landslide, Mudslide, Debris Flows

Likelihood of Future Occurrence–Occasional
Vulnerability–Medium

Hazard Profile and Problem Description

According to the California Geological Survey, landslides refer to a wide variety of processes that result in the perceptible downward and outward movement of soil, rock, and vegetation under gravitational influence. Common names for landslide types include slump, rockslide, debris slide, lateral spreading, debris avalanche, earth flow, and soil creep. Landslides may be triggered by both natural and human-induced changes in the environment that result in slope instability.

The susceptibility of an area to landslides depends on many variables including steepness of slope, type of slope material, structure and physical properties of materials, water content, amount of vegetation, and proximity to areas undergoing rapid erosion or changes caused by human activities. These activities include mining, construction, and changes to surface drainage areas. Landslide events can be determined by the composition of materials and the speed of movement. A rockfall is dry and fast while a debris flow is wet and fast. Regardless of the speed of the slide, the materials within the slide, or the amount of water present in the movement, landslides are a serious natural hazard.

Debris flows, can also occur in some areas of the County and the District. These debris flows generally occur in the immediate vicinity of existing drainage swales or steep ravines. Debris flows occur when near surface soil in or near steeply sloping drainage swales becomes saturated during unusually heavy precipitation and begins to flow downslope at a rapid rate. Debris flows are also common during the rainy season in post fire areas.

Landslides have the potential to displace or cutoff water supply canals and distribution lines supplying District customers.

Location and Extent

Landslides, mudslides, and debris flows can affect certain sloped areas of the District. The CGS has estimated that the risk varies across the District and has created maps showing risk variance. This risk variance falls into multiple categories. These are discussed in Section 4.3.14 of the Base Plan. According to the District Planning Team, risk varies within the District range from low to high. The speed of onset of landslide is often short, especially in post-wildfire burn scar areas, but it can also take years for a slope to fail. Landslide duration is usually short, though digging out and repairing landslide areas can take some time.

Past Occurrences

There have been no federal or state disaster declarations in the County from landslide. The District Planning Team noted the following past occurrences of landslides.

In 1980, NID experienced a major landslide that caused the Combie Phase 1 canal to wash down the mountain side and into the Bear River. In addition to the loss of water supply to much of Placer County, the mud and debris that flowed into the Bear River system necessitated a major environmental cleanup.

In 2011 the PG&E – Bear River Canal suffered a landslide that rendered the canal inoperable for over a month. The canal is one of the main water supply arteries for Placer County. Local water purveyors including NID and PCWA had to enact Water Shortage Contingency Planning and ration water supplies to Ag water customers until repairs were complete.

In 2017 A landslide destroyed an elevated flume section of the South Yuba Canal and interrupted water flows into Nevada County for four months. Alternate supplies and conservation became key to making it through the episode

Vulnerability to and Impacts from Landslide

Although landslides are primarily associated with slopes greater than 15 percent, they can also occur in relatively flat areas and as cut-and-fill failures, river bluff failures, lateral spreading landslides, collapse of wine-waste piles, failures associated with quarries, and open-pit mines. Landslides may be triggered by both natural- and human-caused activity.

Heavy rain events during the winter months tend to destabilize the soils on many of the steep hillsides that NID's Canals flow through. These destabilizations can cause minor landslides or debris flows that slide into or block NID canals. In addition to the blockage, the flows within the canal only exasperate the problem as the water backs up and overflows the berms thereby creating an even more destructive mud/ debris flow.

Impacts in the District may be to structures, infrastructure, and to life safety.

Assets at Risk

Localized flooding has the potential to affect the Districts canal systems, small reservoirs, treated water distribution system, and the North Auburn Water Treatment Plant.

Levee Failure

Likelihood of Future Occurrence–Unlikely
Vulnerability–Medium

Hazard Profile and Problem Description

A levee is a raised area that runs along the banks of a stream or canal. Levees reinforce the banks and help prevent flooding by containing higher flow events to the main stream channel. By confining the flow to a narrower steam channel, levees can also increase the speed of the water. Levees can be natural or man-made.

Levees provide strong flood protection, but they are not failsafe. Levees are designed to protect against a specific flood level and could be overtopped during severe weather events or dam failure. For example, levees can be certified to provide protection against the 1% annual chance flood. Levees reduce, not eliminate, the risk to individuals and structures located behind them. A levee system failure or overtopping can create severe flooding and high water velocities. Levee failure can occur through overtopping or from seepage issues resulting from burrowing rodents, general erosion, excessive vegetation and root systems and other factors that compromise the integrity of the levee. No levee provides protection from events for which it was not designed, and proper operation and maintenance are necessary to reduce the probability of failure.

A majority of the nearly 500 miles of NID canals are manmade and were designed with small levees to direct the flow of water. These canals levees are vulnerable to failure for a multitude of reasons including but not limited to, overtopping flows, rodent and varmint intrusion, vegetation weakening, etc.

Location and Extent

There is not a scientific scale or measurement system in place for levee failure. Expected flood depths from a levee failure in the District vary by event and location. The speed of onset is slow as the river rises, but if a levee fails the warning times are generally short for those in the inundation area. The duration of levee failure risk times can be hours to weeks, depending on the river flows that the levee holds back. When northern California dams and reservoirs are nearing maximum capacity, they release water through the river systems, causing additional burdens on County levees. While the District is not located in areas protected by levees constructed for flood control purposes and seen in the most recent FEMA DFIRMs, the District has over 400 miles of NID canals designed with small levees to direct the flow of water.

Past Occurrences

There have been no federal or state disaster declarations from levee failure. The last levee/canal berm failure occurred in 2012 and caused damage to multiple private properties. Small scale levee failures occur nearly every year during extreme thunderstorm type events. Most of the overtopping's or failures are minor in nature and can be fixed in short order through ongoing maintenance activities.

Vulnerability to and Impacts from Levee Failure

A levee failure can range from a small, uncontrolled release to a catastrophic failure. Levee failure flooding can occur as the result of prolonged rainfall and flooding. The primary danger associated with levee failure is the high velocity flooding of those properties outside and downstream of the breach. When a levee is breached, the flows contained within the canal escape and flood the surrounding private properties including private residences.

Should a levee fail, some or all of the area protected by the levees would be at risk to flooding. Impacts from a levee failure include property damage, critical facility damage, and life safety issues. Business and economic losses could be large as facilities could be flooded and services interrupted. School and road closures could occur. Road closures would impede both evacuation routes and ability of first responders to quickly respond to calls for aid. Other problems connected with levee failure flooding include erosion, sedimentation, degradation of water quality, losses of environmental resources, and certain health hazards.

Much of the Districts 500 miles of canal include a berm for entrapment of flows. These canal berms can be classified as small scale levees. Failure of the levee allows irrigation water to escape the normal water conveyance canal and causes flooding and erosion of the natural landscape. In some cases, these levee breaches can cause damages to private properties.

Assets at Risk

Water and Canal Systems are the assets at risk of a levee failure

Pandemic

Likelihood of Future Occurrence–Occasional
Vulnerability–High

Hazard Profile and Problem Description

According to the World Health Organization (WHO), a disease epidemic occurs when there are more cases of that disease than normal. A pandemic is a worldwide epidemic of a disease. A pandemic may occur when a new virus appears against which the human population has no immunity.

A pandemic occurs when a new virus emerges for which people have little or no immunity, and for which there is no vaccine. This disease spreads easily person-to-person, causes serious illness, and can sweep across the country and around the world in a very short time. The U.S. Centers for Disease Control (CDC) and Prevention has been working closely with other countries and the WHO to strengthen systems to detect outbreaks of that might cause a pandemic and to assist with pandemic planning and preparation. An especially severe pandemic could lead to high levels of illness, death, social disruption, and economic loss.

Location and Extent

During a pandemic, the whole of the District, County, and surrounding region is at risk, as pandemic is a regional, national, and international event. The speed of onset of pandemic is usually short, while the duration is variable, but can last for more than a year as shown in the 1918/1919 Spanish Flu. There is no scientific scale to measure the magnitude of pandemic. Pandemics are usually measured in numbers affected by the pandemic, and by number who die from complications from the pandemic.

Past Occurrences

There has been one state and federal disaster declaration due to pandemic, as shown in Table J-10.

Table J-10 Placer County – State and Federal Pandemic Disaster Declarations 1950-2020

Disaster Type	Federal Declarations		State Declarations	
	Count	Years	Count	Years
Pandemic	1	2020	1	2020

Source: Cal OES, FEMA

The 20th century saw three outbreaks of pandemic.

- The 1918-1919 Influenza Pandemic (H1N1)
- The February 1957-1958 Influenza Pandemic (H2N2)
- The 1968 Influenza Pandemic (H3N2)

To date, the 21st century has seen two acknowledged pandemics.

- 2009 Swine Flu (H1N1)
- 2019/2020 COVID 19

Vulnerability to and Impacts from Pandemic

Pandemics have and will continue to have impacts on human health in the region. A pandemic occurs when a new virus emerges for which there is little or no immunity in the human population; the virus causes serious illness and spreads easily from person-to-person worldwide. There are several strategies that public health officials can use to combat a pandemic. Constant surveillance regarding the current pandemic, use of infection control techniques, and administration of vaccines once they become available. Citizens can help prevent the spread of a pandemic by staying home, or "self-quarantining," if they suspect they are infected. Pandemic does not affect the buildings, critical facilities, and infrastructure in the District. Pandemic can have varying levels of impact to the citizens of the District and greater County, depending on the nature of the pandemic.

Impacts could range from school and business closings to the interruption of basic services such as public transportation, health care, and the delivery of food and essential medicines. Hospitalizations and deaths can occur, especially to the elderly or those with pre-existing underlying conditions. As seen with Covid-19, multiple businesses were forced to close temporarily (some permanently), and unemployment rose significantly. Supply chains for food and essentials can be interrupted.

Assets at Risk

Pandemics do not affect District facilities, but can affect District personnel who operate District facilities.

Severe Weather: Extreme Heat

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

According to FEMA, extreme heat is defined as temperatures that hover 10 degrees or more above the average high temperature for the region and last for several weeks. Heat kills by taxing the human body beyond its abilities. In extreme heat and high humidity, evaporation is slowed, and the body must work extra hard to maintain a normal temperature." Most heat disorders occur because the victim has been overexposed to heat or has over-exercised for his or her age and physical condition. Older adults, young children, and those who are sick or overweight are more likely to succumb to extreme heat.

In addition to the risks faced by citizens of the District, there are risk to the built environment from extreme heat. While extreme heat on its own does not usually affect structure, extreme heat during times of drought can cause wildfire risk to heighten. Extreme heat and high winds can cause power outages and PSPS events, causing issues to buildings in the District.

Extreme heat events are closely related to drought, climate change, and tree mortality when it comes to impacts to District operations. Extreme heat events can range in severity and duration, leading to varying increases in water demand/use along with hazardous work conditions for employees who work outdoors to maintain District function. Extreme heat events typically occur at lower elevations in western Nevada County and can last for short or long periods of time, though climate change may create variations to these

conditions that push the reach of affected areas higher in elevation for a longer duration. Extreme heat events can have fatal effects on native vegetation and trees, leading to stress, partial/complete failure, or increased mortality. Extreme heat events have the potential to cause earlier melt off of snowpack, should these events occur earlier in the summer, leading to water availability issues in the late summer when resources are needed most.

Extreme Heat and Power Shortage/Power Failure

The US power grid crisscrosses the country, bringing electricity to homes, offices, factories, warehouses, farms, traffic lights and even campgrounds. According to statistics gathered by the Department of Energy, major blackouts are on the upswing. Incredibly, over the past two decades, blackouts impacting at least 50,000 customers have increased 124 percent. The electric power industry does not have a universal agreement for classifying disruptions. Nevertheless, it is important to recognize that different types of outages are possible so that plans may be made to handle them effectively. In addition to blackouts, brownouts can occur. A brownout is an intentional or unintentional drop in voltage in an electrical power supply system. Intentional brownouts are used for load reduction in an emergency. Electric power disruptions can be generally grouped into two categories: intentional and unintentional. More information on types of power disruptions can be found in Section 4.3.2 of the Base Plan.

Public Safety Power Shutoff (PSPS)

A new intentional disruption type of power shortage/failure event has recently occurred in California. In recent years, several wildfires have started as a result of downed power lines or electrical equipment. This was the case for the Camp Fire in 2018. As a result, California's three largest energy companies (including PG&E), at the direction of the California Public Utilities Commission (CPUC), are coordinating to prepare all Californians for the threat of wildfires and power outages during times of extreme weather. To help protect customers and communities during extreme weather events, electric power may be shut off for public safety in an effort to prevent a wildfire. This is called a PSPS. More information on PSPS criteria can be found in Section 4.3.2 of the Base Plan.

Location and Extent

Heat is a regional phenomenon and affects the whole of the District. Heat emergencies are often slower to develop, taking several days of continuous, oppressive heat before a significant or quantifiable impact is seen. Heat waves do not strike victims immediately, but rather their cumulative effects slowly affect vulnerable populations and communities. Heat waves do not generally cause damage or elicit the immediate response of floods, fires, earthquakes, or other more "typical" disaster scenarios.

The NWS has in place a system to initiate alert procedures (advisories or warnings) when extreme heat is expected to have a significant impact on public safety. The expected severity of the heat determines whether advisories or warnings are issued. The NWS HeatRisk forecast provides a quick view of heat risk potential over the upcoming seven days. The heat risk is portrayed in a numeric (0-4) and color (green/yellow/orange/red/magenta) scale which is similar in approach to the Air Quality Index (AQI) or the UV Index. This can be seen in Section 4.3.2 of the Base Plan.

NID covers both the lower and upper elevations of the County. Separate location and extent discussions for these areas follow. Lower elevations of the District Service area are more vulnerable to extreme heat events as average temperature in these areas are lower than those seen in higher elevations. High elevation forest communities may experience stress from extreme heat events as the likelihood of extreme heat at these elevations and the forest community's natural adaptations to extreme heat may be low.

Past Occurrences

There has been no federal or state disaster declarations in the County for heat. The District Planning Team noted that since extreme heat is a regional phenomenon, events that affected the County also affected the District. Those past occurrences were shown in the Base Plan in Section 4.3.2.

The district has been affected economically by PSPS shutdowns. Because it is not reasonable for a water utility to halt operations for any extended period of time, the District has invested in backup generators at key facilities so there is no interruption in service. These facility upgrades cost $296,974 and NID's hydropower generation is also significantly affected during this power shut-off events.

The District has experienced multiple PSPS related outages during the event period. The loss of power at District facilities has limited both treated and irrigation water supply availability within Placer County. The District was able to mitigate these events with the rental of portable generators, however this is a temporary solution. Future mitigation will occur with the installation of a permanent stationary generator at the North Auburn Water Treatment Plant.

Vulnerability to and Impacts from Extreme Heat

The District experiences temperatures in excess of 100°F during the summer and fall months. The temperature moves to 105-110°F in rather extreme situations. During these times, drought conditions may worsen. Also, power outages and PSPS events may occur during these times as well. Health impacts, including loss of life, are the primary concern with this hazard, though economic impacts are also an issue.

Days of extreme heat have been known to result in medical emergencies, and unpredictable human behavior. Periods of extended heat and dryness (droughts) can have major economic, agricultural, and water resources impacts. Extreme heat can also dry out vegetations, making it more vulnerable to wildfire ignitions.

District powerhouses, water treatment plants and offices all run on external power provided by PG&E. In the event of prolonged PSPS events, these assets run a vulnerability risk.

Assets at Risk

District powerhouses, water treatment plants and offices are at risk from this hazard. A PSPS event affects the District's North Auburn Water Treatment Plant, and the Edgewood and Magnolia canal systems.

Severe Weather: Freeze and Snow

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

According to the NWS and the WRCC, winter snowstorms can include extreme cold and freezing temperatures, heavy snow, ice, and blizzard conditions. Heavy snow can immobilize a region, stranding commuters, stopping the flow of supplies, and disrupting emergency and medical services. Accumulations of snow can collapse roofs and knock down trees and power lines. In rural areas, homes and farms may be isolated for days, and unprotected livestock may be lost. The cost of snow removal, damage repair, and business losses can have a tremendous impact on cities and towns.

Heavy accumulations of ice can bring down trees, electrical wires, telephone poles and lines, and communication towers. Communications and power can be disrupted for days until the damage can be repaired. Power outages can have a significant impact on communities, especially critical facilities such as public utilities. Even small accumulations of ice may cause extreme hazards to motorists and pedestrians.

Some winter storms are accompanied by strong winds, creating blizzard conditions with blinding wind-driven snow, severe drifting, and dangerous wind chills. Strong winds accompanying these intense storms and cold fronts can knock down trees, utility poles, and power lines. Blowing snow can reduce visibility to only a few feet in areas where there are no trees or buildings. Serious vehicle accidents with injuries and deaths can result. Freezing temperatures can cause significant damage to the agricultural industry.

Extreme Cold/Freeze and Power Shortage/Power Failure

The US power grid crisscrosses the country, bringing electricity to homes, offices, factories, warehouses, farms, traffic lights and even campgrounds. According to statistics gathered by the Department of Energy, major blackouts are on the upswing. Incredibly, over the past two decades, blackouts impacting at least 50,000 customers have increased 124 percent. The electric power industry does not have a universal agreement for classifying disruptions. Nevertheless, it is important to recognize that different types of outages are possible so that plans may be made to handle them effectively. In addition to blackouts, brownouts can occur. A brownout is an intentional or unintentional drop in voltage in an electrical power supply system. Intentional brownouts are used for load reduction in an emergency. Electric power disruptions can be generally grouped into two categories: intentional and unintentional. More information on types of power disruptions can be found in Section 4.3.2 of the Base Plan.

Location and Extent

NID covers both the lower and upper elevations of the County. Separate location and extent discussions for these areas follow.

Freeze and snow are regional issues, meaning the entire District is at risk to cold weather and freeze events. While there is no scale (i.e. Richter, Enhanced Fujita) to measure the effects of freeze, the WRCC reports that in a typical year, minimum temperatures fall below 32°F on 22.6 days with 0 days falling below 0°F

in western Placer County. Snowfall is measured in depths, and the WRCC reports that average snowfall on the western side of the County is 1.4 inches. Freeze and snow has a slow onset and can generally be predicted in advance for the County. Freeze events can last for hours (in a cold overnight), or for days to weeks at a time. Snow event can last for hours or days, but is more unlikely in the western portion of the County. When it does snow, the snow often melts relatively quickly.

Freeze and snow are regional issues, meaning the entire District is at risk to cold weather and freeze events. While there is no scale (i.e. Richter, Enhanced Fujita) to measure the effects of freeze, the WRCC reports that in a typical year, minimum temperatures fall below 32°F on 209.0 days with 0.4 days falling below 0°F in eastern Placer County. Snowfall is measured in depths, and the WRCC reports that average snowfall on the eastern side of the County is 190.7 inches. Freeze and snow has a slow onset and can generally be predicted in advance for the County. Freeze events can last for hours (in a cold overnight), or for days to weeks at a time. Snow event can last for hours or days, and the snow stays all winter in the eastern portion of the County, often with significant snow depths.

Past Occurrences

There has been no federal and one state disaster declarations in the County for freeze and snow, as shown on Table J-11.

Table J-11 Placer County – State and Federal Disaster Declarations from Freeze and Snow 1950-2020

Disaster Type	State Declarations		Federal Declarations	
	Count	Years	Count	Years
Freeze	1	1972	0	–

Source: Cal OES, FEMA

The District noted that cold and freeze is a regional phenomenon; events that affected the County also affected the District. Those past occurrences were shown in the Base Plan in Section 4.3.3.

Past freeze / snow events have led to disruption of water flow in the Districts Mountain Division. In 2017, a heavy snow event occurred that halted access to the Districts facilities that supply water to the Placer County corridor. In addition to the flow issues, snow had filled in the canal. Crews initially tried access via helicopter, but continue inclement weather limited that. Eventually, crews utilized snow cats to gain access an event that took multiple days to gain access and another couple of days to clear snow from the canal. This is just a single example of how freeze and snow events could detrimentally affect water supplies. These events happen on a regular basis.

Vulnerability to and Impacts from Severe Weather: Freeze and Snow

NID is subject to multiple hazards during severe freeze events. First, NIDs High Sierra facilities are vulnerable to freezing so severe that the waters within the supply canals become solid ice. When this occurs, water deliveries to the system become impossible. NID has experienced multiple events where crews were sent out day and night to break ice to keep water flowing to critical water treatment facilities.

Second, freezing in the lower reaches of NID's service area where customers are not acclimated or prepared for cold temperatures causes freezing of water distribution systems and burst pipes. Once the pipes thaw, water free flows through the broken pipes and creates water demands that NID treatment systems have a tough time keeping up with.

Lastly severe winter weather with freezing and heavy snow makes access to the District's mountain division conveyance facilities nearly impossible. The District is equipped with snow cats, snow mobiles, and tracked sided by sides, yet access during inclement weather can takes days.

Assets at Risk

The District's Water Canal Systems are at risk from this hazard.

Severe Weather: Heavy Rains and Storms

Likelihood of Future Occurrence–Highly Likely
Vulnerability–High

Hazard Profile and Problem Description

Storms in the District occur annually and are generally characterized by heavy rain often accompanied by strong winds and sometimes lightning and hail. Approximately 10 percent of the thunderstorms that occur each year in the United States are classified as severe. A thunderstorm is classified as severe when it contains one or more of the following phenomena: hail that is three-quarters of an inch or greater, winds in excess of 50 knots (57.5 mph), or a tornado. Heavy precipitation in the District falls mainly in the fall, winter, and spring months, depending on the location in the County.

Location and Extent

Heavy rain events occur on a regional basis. Rains and storms can occur in any location of the District. All portions of the District are at risk to heavy rains. Most of the severe rains occur during the fall, winter, and spring months. There is no scale by which heavy rains and severe storms are measured. Magnitude of storms is measured often in rainfall and damages. The speed of onset of heavy rains can be short, but accurate weather prediction mechanisms often let the public know of upcoming events. Duration of severe storms in California, Placer County, and the District can range from minutes to hours to days. Information on precipitation extremes can be found in Section 4.3.4 of the Base Plan.

Past Occurrences

There have been past disaster declarations from heavy rains and storms, which were discussed in Past Occurrences of the flood section above. According to historical hazard data, severe weather, including heavy rains and storms, is an annual occurrence in the District. This is the cause of many of the federal disaster declarations related to flooding. Heavy rain, thunderstorm activity, and hail usually occur on an annual basis in the NID service area.

Vulnerability to and Impacts from Heavy Rain and Storms

Heavy rain and severe storms are the most frequent type of severe weather occurrences in the District. These events can cause localized flooding. Elongated events, or events that occur during times where the ground is already saturated can cause 1% and 0.2% annual chance flooding. Wind often accompanies these storms and has caused damage in the past. Hail and lightning are rare in the District.

Actual damage associated with the effects of severe weather include impacts to property, critical facilities (such as utilities), and life safety. Heavy rains and storms often result in localized flooding creating significant issues. Roads can become impassable and ground saturation can result in instability, collapse, or other damage to trees, structures, roadways and other critical infrastructure. Floodwaters and downed trees can break utilities and interrupt services.

During periods of heavy rains and storms, power outages can occur. These power outages can affect pumping stations and lift stations that help alleviate flooding. More information on power shortage and failure can be found in the Severe Weather: Extreme Heat Section above, as well as in Section 4.3.2 of the Base Plan.

Often during heavy rain events, the raw water distribution system can be impacted. Heavy runoff from storm activity can cause excessive water in District canals resulting in an overtopping of the canal. An overtopping will washout the canal berm resulting in localized flood damage and interruption of the water supply. On an annual basis the District receives 20 to 40 claims stemming from these overtopping events.

Assets at Risk

The District's Water Canal Systems are of the greatest risk to heavy rains and storms.

Severe Weather: High Winds and Tornadoes

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

High winds, as defined by the NWS glossary, are sustained wind speeds of 40 mph or greater lasting for 1 hour or longer, or winds of 58 mph or greater for any duration. High winds can cause significant property and crop damage, threaten public safety, and have adverse economic impacts from business closures and power loss. High winds can also cause PSPS events.

Tornadoes are rotating columns of air marked by a funnel-shaped downward extension of a cumulonimbus cloud whirling at destructive speeds of up to 300 mph, usually accompanying a thunderstorm. Tornadoes form when cool, dry air sits on top of warm, moist air. Tornadoes are the most powerful storms that exist. Tornadoes, though rare, are another severe weather hazard that can affect areas of the Placer County Planning Area, primarily during the rainy season in the late fall, winter, and early spring, primarily in the western part of the County.

Location and Extent

The entire District is subject to significant, non-tornadic (straight-line), winds. Each area of the County is at risk to high winds. Magnitude of winds is measured often in speed and damages. These events are often part of a heavy rain and storm event, but can occur outside of storms. The speed of onset of winds can be short, but accurate weather prediction mechanisms often let the public know of upcoming events. Duration of winds in California is often short, ranging from minutes to hours. The Beaufort scale is an empirical 12 category scale that relates wind speed to observed conditions at sea or on land. Its full name is the Beaufort Wind Force Scale. The Beaufort Scale was shown in Section 4.3.5 of the Base Plan.

Portions of the County are also located in a special wind hazard region, which is a result of foehn winds. A foehn wind is a type of dry down-slope wind that occurs in the lee (downwind side) of a mountain range. Winds of this type are called "snow-eaters" for their ability to make snow melt or sublimate rapidly. This snow-removing ability is caused not only by warmer temperatures, but also the low relative humidity of the air mass coming over the mountain(s). They are also associated with the rapid spread of wildfires, making some regions which experience these winds particularly fire prone.

Tornadoes, while rare, can occur at any location in the County and District, but would more likely occur in Western Placer. Prior to February 1, 2007, tornado intensity was measured by the Fujita (F) scale. This scale was revised and is now the Enhanced Fujita scale. Both scales are sets of wind estimates (not measurements) based on damage. The new scale (EF) provides more damage indicators (28) and associated degrees of damage, allowing for more detailed analysis and better correlation between damage and wind speed. It is also more precise because it considers the materials affected and the construction of structures damaged by a tornado. The F Scale and EF Scale are shown in Section 4.3.5 of the Base Plan.

Past Occurrences

There has been no federal or state disaster declarations in the County for winds and tornadoes. The District noted that since high winds is a regional phenomenon, events that affected the lower and middle elevations of the County also affected the District. Those past occurrences were shown in the Base Plan in Section 4.3.5.

Vulnerability to and Impacts from Severe Weather: Wind and Tornado

High winds are common occurrences in the District throughout the entire year. Straight line winds are primarily a public safety and economic concern. Windstorm can cause damage to structures and power lines which in turn can create hazardous conditions for people. Debris flying from high wind events can shatter windows in structures and vehicles and can harm people that are not adequately sheltered. High winds can impact critical facilities and infrastructure and can lead to power outages. Wind can also drive wildfire flames, spreading wildfires quickly During periods of high winds and dry vegetation, wildfire risk increases. High winds that occur during periods of extreme heat can cause PSPS events to be declared in the County. More information on power shortage and failure can be found in the Severe Weather: Extreme Heat Section above, as well as in Section 4.3.2 of the Base Plan.

Impacts from high winds in the District will vary. Future losses from straight line winds include:

- Downed trees
- Power line impacts and economic losses from power outages
- Increased PSPS events
- Occasional building damage, primarily to roofs

Assets at Risk

All District assets from Table J-4 are at risk from this hazard.

Tree Mortality

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

One of the many vulnerabilities of drought in Placer and Nevada County is the increased risk of widespread tree mortality events that pose hazards to people, homes, and community infrastructure, create a regional economic burden to mitigate, effect overall forest health, and contribute to future fuel loads in forests surrounding communities. During extended drought, tree mortality is driven by a build-up in endemic bark beetle populations and exacerbated by latent populations of a suite of native insects and disease. Non-native forest pests (insects and/or pathogens) can also contribute to tree mortality events.

Location and Extent

Onset of tree mortality events can be relatively fast; however conditions – such as high stand densities – that lead to tree mortality accumulate slowly over time. Duration of tree mortality is lengthy, as once the tree dies, it remains in place until removed by human activity, wildfire, or breakdown of the wood by nature. Many areas in Placer County have seen increases in tree mortality. The County has mapped these areas, and that map was shown in Section 4.3.18 of the Base Plan. Using a color legend, the map provided by CAL FIRE shows a scale of:

- Deep burgundy depicting areas with more than 40 dead trees per acre
- Red depicting 15 - 40 dead trees per acre
- Orange depicting 5 -15 dead trees per acre
- Yellow depicting 5 or less dead trees per acre

In the past decade, mortality has increased in the eastern portion of Placer County. During the 2012-2018 drought, the state of California Tree Mortality Task force designated multiple Tier 1 and Tier 2 High Hazard Zones where tree morality posed an elevated risk to human health, properties, and resource values. A number of Placer County areas were designated during this event and the majority of Placer County watersheds were designated as Tier 2 high hazard zones because of the significant levels of tree mortality, along with numerous Tier 1 High hazard “hot spots”. A map of these areas was shown in in Section 4.3.18 of the Base Plan.

Past Occurrences

There have been no state or federal disasters in the County related directly to tree mortality, though it has most likely contributed to the intensity of past wildfires in the County. Those events are shown in the Past Occurrences section of Wildfire below. In 2015, then-Governor Edmund G. Brown Jr. proclaimed a state of emergency due to the extreme hazard of the dead and dying trees. Following the proclamation, 10 counties were determined to be most affected, which included Placer County. Placer County proclaimed a local emergency due to tree mortality conditions on Dec. 8, 2015.

Tree mortality is a risk to the District's canal systems. As trees die and rot, they become week and fall. In 2013, the District experienced a wind event that caused many of the standing dead trees to fall across elevated fume sections of the Districts water supply canal. The District coordinated with PG&E on clean up and repair which took over a month. During this time, District customers were required to conserve water use until repairs could be completed.

The District budgets tens of thousands of dollars annually for hazard tree removal in campgrounds where public safety is paramount and at other vulnerable District facilities, including the vicinity around water treatment plants.

Vulnerability to and Impacts from Tree Mortality

Placer and Nevada Counties are unique in that many residential and business areas of the community are in the wildland urban interface/intermix with the forest. Trees in these interface/intermix areas are particularly vulnerable to insect and/or drought driven mortality because of the additional stressors that urban environments impose on trees (i.e. soil compaction, altered hydrology, physical damage, heat islands etc.). This exacerbates the occurrence of tree mortality within the populated settings of the counties.

Dead trees are a hazard to the general public and forest visitors, but the risk of injury, death, property damage or infrastructure damages varies depending how the hazard interacts with potential targets. Dead trees within the wildland urban interface (WUI) or urban areas pose a greater risk to due to their proximity to residents, businesses, and road, power, water, and communication infrastructure than dead or dying trees pose in remote areas with no nearby structures, infrastructure or recreation areas.

Dead trees may fall or deteriorate in their entirety or in part – either mechanism has the potential for injury, death, or inflicting severe damage to targets. As the time since tree mortality increases, so does the deterioration of wood and the potential for tree failure.

The District owns open watershed lands as well as properties in the WUI which contain key infrastructure and recreation areas with numerous potential targets. Depending on the size and location of hazard trees, removal of part or all of the tree can be both difficult, risky, and costly in some cases. Every year, trees are identified on District property that are adjacent to significant targets, both District-owned and private. The District is vulnerable to the risk of damage caused by tree failure, the financial burden of preemptive removal, and the potential liability of neglecting to remove significant hazards on time.

In addition to infrastructure and human health and safety concerns, excessive tree mortality has an impact on forest health and wildfire risk in affected stands. Trees killed by pests and disease have the potential to

spread these illnesses to healthy live trees, decreasing overall forest health. Downed and standing dead and dry woody material additionally increases the risk of extreme wildfire, leading to a potential loss of large tracts of forest land. This has significant effects on water quality and quantity, water availability, and sedimentation into liquid storage reservoirs. Post wildfire forests may take many decades to recover, and they have significant impacts on downstream storage reservoirs and water system infrastructure.

Assets at Risk

Most notable assets at risk are canal systems, campgrounds, buildings/structures, and power lines in striking distance from dead, dying, or damaged trees.

Wildfire

Likelihood of Future Occurrence–Highly Likely
Vulnerability–High

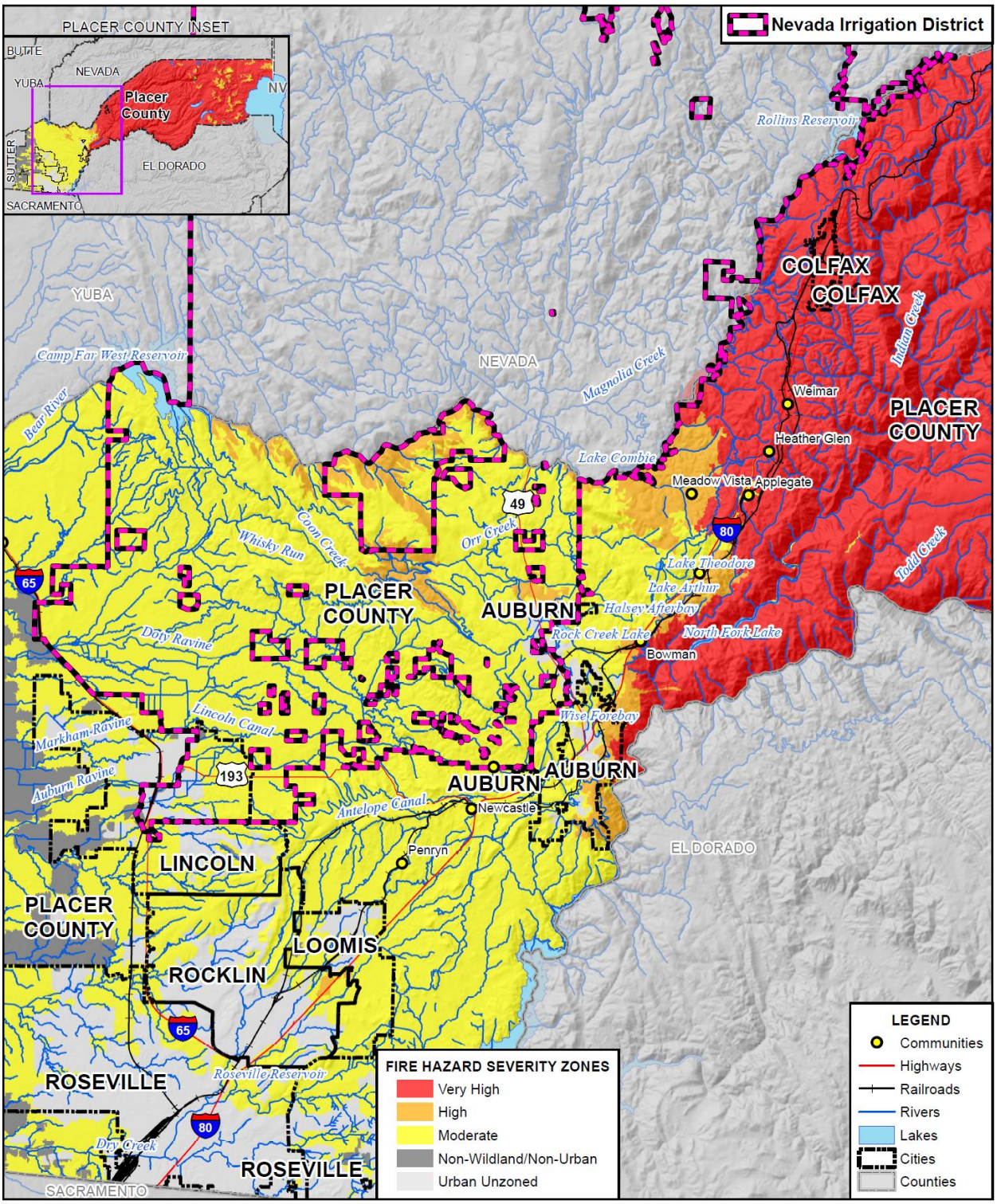
Hazard Profile and Problem Description

Wildland fire and the risk of a conflagration is an ongoing concern for the NID. Throughout California, communities are increasingly concerned about wildfire safety as increased development in the foothills and mountain areas and subsequent fire control practices have affected the natural fire regime. Wildland fires affect grass, forest, and brushlands, as well as any structures located within them. Where there is human access to wildland areas the risk of fire increases due to a greater chance for human carelessness and historical fire management practices. Historically, the fire season extends from early spring through late fall of each year during the hotter, dryer months; however, in recent years, the risk of wildfire has become a year around concern. Fire conditions arise from a combination of high temperatures, low moisture content in the air and fuel, accumulation of vegetation, and high winds. While wildfire risk has predominantly been associated with more remote forested areas and wildland urban interface (WUI) areas, significant wildfires can also occur in more populated, urban areas.

Location and Extent

Wildfire can affect all areas of the District. CAL FIRE has estimated that the risk varies across the District and has created maps showing risk variance. Following the methodology described in Section 4.3.19 of the Base Plan, wildfire maps for the NID were created. Figure J-5 shows the CAL FIRE FHSZ in the District. As shown on the maps, FHSZs within the District range from Urban Unzoned to Very High.

Figure J-5 NID – Fire Hazard Severity Zones



FOSTER MORRISON CONSULTING

COUNTY OF Placer

Data Source: Cal-Fire (Draft 09/2007 - c31fhszl06_1, Adopted 11/2007 - fhszs06_3_31, Recommended 12/2008 - c31fhszl06_3), Placer County GIS, Cal-Atlas, NVBLM; Map Date: 2021.

Wildfires tend to be measured in structure damages, injuries, and loss of life as well as on acres burned. Fires can have a quick speed of onset, especially during periods of drought or during hot dry summer months. Fires can burn for a short period of time, or may have durations lasting for a week or more.

Past Occurrences

There has been five state and six federal disaster declarations for Placer County from fire. These can be seen in Table J-12.

Table J-12 Placer County – State and Federal Disaster Declarations Summary 1950-2020

Disaster Type	State Declarations		Federal Declarations	
	Count	Years	Count	Years
Fire	5	1961, 1965, 1973, 1987, 2010	6	2002, 2004, 2008, 2009, 2014 (twice)

Source: Cal OES, FEMA

The Washoe Fire in August **2007** had impacts to the NID. This fire occurred in the wildland urban interface area of the Tahoe Park and Tahoe Woods subdivisions, along the west shore of Lake Tahoe. Although no lives were lost, the fire destroyed 5 residential structures and encompassed 19 acres. Power and gas utilities incurred damages. There were also losses to timber assets, loss of watershed protection, and loss of the aesthetic value of a scenic corridor. This event caused major disruptions to the west shore and Tahoe City traffic and business on a busy summer weekend. Highway 89 in West Lake was closed for a period of time.

2009. The wind driven 49er Fire occurred in the urban sections of North Auburn and burned through the Districts North Auburn Water Treatment Plant. 62 homes were destroyed and infrastructure damaged. Power remained out for multiple days making the production of potable water to the area difficult.

2015 The Lowell Hill burned along Bear River corridor and through many of the of the District's water conveyance facilities. Access to canal systems was impossible and the threat of contaminants from firefighting actives was a concern. In addition, the Districts powerhouses were knocked offline during the event.

The most notable recent wildfire to impact the District was the Jones Fire in 2020. The wind driven fire occurred in the South Yuba River canyon and burned over the Districts Newtown Canal. 21 structures and 705 acres were burned during the 12 day fire, having impacts to communities as well as infrastructure and the health of the landscape within the burn area.

Air quality considerations are a vulnerability when particulate AQI index reaches unhealthy levels, it becomes a safety concern for staff to be in the field. Additional PPE and rest periods are necessary to keep staff safe.

Vulnerability to and Impacts from Wildfire

Risk and vulnerability to the Placer County Planning Area and the District from wildfire is of significant concern, with some areas of the Planning Area being at greater risk than others as described further in this

section. High fuel loads in the Planning Area, combined with a large built environment and population, create the potential for both natural and human-caused fires that can result in loss of life and property. These factors, combined with natural weather conditions common to the area, including periods of drought, high temperatures, low relative humidity, and periodic winds, can result in frequent and potentially catastrophic fires. During the nearly year around fire season, the dry vegetation and hot and sometimes windy weather results in an increase in the number of ignitions. Any fire, once ignited, has the potential to quickly become a large, out-of-control fire. As development continues throughout the County and the District, especially in these interface areas, the risk and vulnerability to wildfires will likely increase.

Potential impacts from wildfire include loss of life and injuries; damage to structures and other improvements, natural and cultural resources, croplands, and loss of recreational opportunities. Wildfires can cause short-term and long-term disruption to the District. Fires can have devastating effects on watersheds through loss of vegetation and soil erosion, which may impact the District by changing runoff patterns, increasing sedimentation, reducing natural and reservoir water storage capacity, and degrading water quality. Fires can also affect air quality in the District; smoke and air pollution from wildfires can be a severe health hazard.

Although the physical damages and casualties arising from large fires may be severe, it is important to recognize that they also cause significant economic impacts by resulting in a loss of function of buildings and infrastructure. Economic impacts of loss of transportation and utility services may include traffic delays/detours from road and bridge closures and loss of electric power, potable water, and wastewater services. Schools and businesses can be forced to close for extended periods of time. Recently, the threat of wildfire, combined with the potential for high winds, heat, and low humidity, has caused PG&E to initiate PSPSs which can also significantly impact a community through loss of services, business closures, and other impacts associated with loss of power for an extended period. More information on power shortage and failure can be found in the Severe Weather: Extreme Heat Section above, as well as in Section 4.3.2 of the Base Plan. In addition, catastrophic wildfire can create favorable conditions for other hazards such as flooding, landslides, and erosion during the rainy season.

The size in acreage and the severity of wildfire in California is increasing. Five of the top twenty largest California wildfires occurred in 2020. The deadliest and most destructive of which was the Camp Fire which burned over 150,000 acres, 18,000 structures, and caused at least 85 fatalities in 2018. The massive scale of this wildfire had significant impacts to not only the public, but utility infrastructure as well. Costs of disaster related debris removal, emergency protective measures to protect life and property, and permanent repair to damaged or destroyed infrastructure, including repair and replacement of Paradise Irrigation District's water system features, reached more than $129 million,

All of the Districts Mountain Division infrastructure is located within an extreme fire threat zone. A major fire in this area has the potential to cut off water supply to Placer County. In addition, District infrastructure is vulnerable to burning during a fire. Damage to any of these facilities may take a long period of time to facilitate repairs.

Assets at Risk

All District assets are vulnerable to wildfire damages.

J.6 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation education, outreach, and partnerships, and other mitigation efforts.

J.6.1. Regulatory Mitigation Capabilities

Table J-13 lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the NID.

Table J-13 NID Regulatory Mitigation Capabilities

Plans	Y/N Year	Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Comprehensive/Master Plan/General Plan	Y	Last update 2011. The plan covers the expected expansion of District facilities over the next 30 years. The hazards covered include the expected flow ranges thus allowing for upsizing of pipes and canals to prevent storm water flooding. The District is in the process of updating this Raw Water Master Plan in the fall of 2021.
Capital Improvements Plan	Y	Ongoing annually. Projects are initiated based on Master Planning, facility inspection, and available capacity.
Economic Development Plan		N/A
Local Emergency Operations Plan	Y	The District has multiple Emergency Plans that are updated annually. These plans cover emergencies ranging from treated water supply to a major dam failure.
Continuity of Operations Plan		In development
Transportation Plan		N/A
Stormwater Management Plan/Program	Y	Storm water management is covered by District policy. The policy states all future facilities will be designed in a manner that does not allow storms water to infiltrate District canals.
Engineering Studies for Streams	Y	Studies are ongoing for stream health, flow rates, and ramping rates.
Community Wildfire Protection Plan	N	Covered in our Emergency Response Plans.
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)		The District also maintains a drought contingency plan to assist water management during periods of drought or water supply shortages, a Public Safety Plan for FERC Facilities, an Owner's Dam Safety Plan for dams; a Vegetation Management Plan for powerhouses, powerlines, penstocks, and canals/flumes; and an Illness and Injury Prevention Plan.
Building Code, Permitting, and Inspections	**Y/N**	**Are codes adequately enforced?**
Building Code	N/A	Version/Year: N/A

Building Code Effectiveness Grading Schedule (BCEGS) Score	N/A	Score:
Fire department ISO rating:	N/A	Rating:
Site plan review requirements	N/A	
Land Use Planning and Ordinances	**Y/N**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning ordinance	N/A	
Subdivision ordinance	N/A	
Floodplain ordinance	N/A	
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	N/A	
Flood insurance rate maps	N/A	
Elevation Certificates	N/A	
Acquisition of land for open space and public recreation uses	N/A	
Erosion or sediment control program	N/A	
Other	N/A	
How can these capabilities be expanded and improved to reduce risk?		
The District will continue to update and add to plans that mitigate hazards in the District.		

Source: NID

As indicated above, the District has several programs, plans, policies, and codes and ordinances that guide hazard mitigation. Some of these are described in more detail below.

NID Agricultural Water Management Plan, 2015 – Updated 2021

The Agricultural Water Management Planning Act requires all agricultural water suppliers that provide water to 10,000 or more irrigated acres to adopt and submit an AWMP to the California Department of Water Resources (DWR). The purpose of the Act is to evaluate water use and applicable management practices to make the best use of available resources. The District's AWMP also addresses the new AWMP requirements established by the Governor in Executive Order B-29-15 (April 1, 2015), and listed below.

- Prepare a Drought Management Plan that describes the actions and measures the supplier will take to manage water demand during drought; and,
- Quantify water supplies and demands for 2013, 2014, and 2015, to the extent data is available.

This AWMP addresses the District's water system and includes a description of the service area, water uses, water resources, and a comparison of water supply and water demands during the planning cycle (2011 through 2015). Also described are the District's water supply reliability, water use efficiency information, water shortage allocation policies, and Drought Management Plan. Urban Water management Plan, 2015 – Updated 2021 The Urban Water Management Planning Act requires every urban water supplier providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually to adopt and submit a UWMP every five years to the California Department of Water Resources (DWR). The Act describes the contents of the UWMP as well as how

urban water suppliers should adopt and implement the UWMP. This UWMP addresses the District's water system and includes a description of the service area, water use, water supply sources, and a comparison of water supply and water demands during normal, single dry, and multiple-dry years. Also described is the District's water conservation program.

Raw Water Master Plan, 2013 – Updated 2022

Nevada Irrigation District's Plan for Water was last updated in 2005 and adopted in 2013. The plan helps guide decisions related to the water system over the next 50 years. Long range planning ultimately involves forecasting & projecting future conditions based on realistic, valid and supportive assumptions. Regardless of the technology, science, or process used, assumptions still must be made to produce a forecast. The District is updating the plan to reflect changes in water demand, supply and the potential effects of climate change. The plan is an organizational tool that seeks to align resource decision making with community values and District operational needs, including technical and cost criteria requirements. When complete the plan will show how a variety of future water supply and demand scenarios could be integrated to ensure our community enjoys the same high-quality, reliable water system we have now. The Plan for Water is born of the FERC relicensing effort, climate change impacts, financial requirements, and new regulatory requirements. The Plan for Water does not re-analyze or revisit any new requirements set by FERC or the State. Instead, it sets these requirements as the new normal, and looks ahead 50 years to anticipate potential supply/demand scenarios and identify alternative solutions

Vegetation Management Plan

The Vegetation Management Plan ("VMP") addresses vegetation modification guidelines and best practices to minimize wildfire risk associated with the District's powerhouses and related transmission lines, penstocks, and flumes located within the District's boundary in both Nevada County and Placer County, California. The VMP has been developed to identify best management practices for vegetation management methods and applications for the District's seven (7) powerhouses and their associated transmission lines, penstocks, and canals/flumes. The VMP was also developed with the inclusion of invasive weed management, revegetation, and human and resource protection measures as appropriate. The purpose of the VMP is to provide fire prevention procedures, reporting, and safe fire avoidance and suppression practices for District personnel and contractors responsible for operating and maintaining the existing District hydroelectric facilities. A primary purpose of the VMP is to establish procedures and protocols for management of native vegetation and treatment of invasive weeds in order to maintain a desirable environmental condition that is consistent with the safe and effective operation and maintenance (O&M) of District hydroelectric facilities. The VMP contains descriptions of specific vegetation management actions, including treatment of invasive weeds, which the District will use to achieve desired conditions in and around project-related transmission corridors, hydroelectric facilities, and access roads that are associated with each of the District's seven powerhouses. The vegetation management strategies outlined in the VMP describe how the District will achieve a variety of desired conditions, dependent on the type of site, from bare ground (powerhouses and switchyards) to compatible native vegetation communities (penstocks and transmission corridors).

Emergency Action Plan

The Emergency Action Plan (EAP) is to reduce the risk of loss of life, injuries, and damage to property that could occur in the unlikely event of a failure or operational incident at one or more of the Nevada Irrigation District (NID/District) facilities covered by the EAP.

It has been determined that water storage behind the dams making up the Yuba-Bear Project, Combie Dam, Scotts Flat Dam, Deer Creek Diversion Dam, and Loma Rica Airport Dam may present a potential hazard to downstream inhabitants and property in the event of a dam failure. To minimize the chances for loss of life and damage to property, it is important to respond quickly to a potentially hazardous situation and to provide a coordinated effort with clearly assigned areas of responsibilities.

Timely detection and identification of a dam safety emergency is a necessary component of planning and operation of dam facilities. Once an emergency situation is identified, proper evaluation, classification, and notification to internal and external agencies is critical for reducing downstream effects and the potential for loss of life. The EAP includes preventative and mitigation actions for responding to potential or active dam safety emergencies. The EAP is intended to provide information and structure to assist the District and emergency responders with executing a coordinated and effective emergency response. The EAP is a confidential document and not available to the general public.

Healthy Forest Management and Wildfire Mitigation Plan

NID owns nearly 6,000 acres of forested land, generally located in borders around storage reservoirs and in scattered parcels where District infrastructure is located. Strategic forest management is therefore necessary for the District and those that rely on its water supply for the protection of source water, the water system, ecosystem values, and human health and property. The past 30 years of reduced logging and over a century of suppressing the frequent, low to moderate-intensity fire cycles with which local forest communities evolved, has led to overcrowded forest conditions that are at-risk of unnaturally severe wildfire. This plan is intended to provide management guidelines that include: an overview of the District's forest land, forest issues, program objectives and action items, and supporting information. The priority objectives of the District's forestry program involve significantly reducing the risk of wildfire ignition and hazardous trees around storage reservoirs, hydroelectric and treatment facilities, water conveyance infrastructure and within recreation areas, where risks to human health and safety, water supply, and system operation are highest.

Water Planning Projections

The Water Planning Projections consists of three studies that analyze the hydrology, water supply and water demand that help NID determine if its water storage and delivery system will provide sufficient water to meet customer demands over time and under variable conditions. The Water Planning Projections are used to prepare a number of planning reports such as the Urban Water Management Plan and the Agricultural Management Plan required to be updated and submitted to the State of California every five years. The Water Planning Projections is also used to prepare the District's Plan for Water, formerly called a Raw Water Master Plan, and is considered when making decisions about capital improvements to its water storage and delivery system.

Owner's Dam Safety Program

NID owns, operates, and maintains dams and the associated appurtenant works. Under normal circumstances, these assets produce hydroelectric power and water for consumptive and irrigation uses. Under adverse conditions, such as those related to hydrologic, geologic, and seismic hazards, these assets may pose a risk to lives and property. It is the objective of NID to mitigate these risks and maintain the long-term safe and reliable operation of these assets. It is the policy of NID to continue the safe operations of the dam inventory and associated appurtenant works, while maintaining compliance with all applicable laws and regulations. The purpose of the Owner's Dam Safety Program (ODSP) is to manage the safety of the District dams and their ancillary facilities for the protection of life, property, and the environment. The ODSP is intended to ensure that NID's Board of Directors, Management, Chief Dam Safety Coordinator (CDSC), Dam Safety Engineer (DSE), dam operational, maintenance, and engineering staff, consultants, construction contractors, and other agents have a good understanding and constant awareness of the on-going need to watch for and improve the safety of the dams to ensure the safety of the public. This ODSP is applied to all the District Dams and the ancillary facilities under the jurisdiction of Federal Energy Regulatory Commission (FERC) or California Division of Safety of Dams (DSOD). These include FERC's Yuba-Bear Project (P-2266), Combie Dam Project (P-2981), Scotts Flat Dam Project (P-5930), and Loma Rica and Deer Creek Diversion Dams (both are DSOD jurisdiction only). The ODSP also applies to the spillways, penstocks, outlet structures, instruments, reservoirs, and stream beds associated with the dams.

Drought Contingency Plan

The purpose of the Nevada Irrigation District's Drought Contingency Plan is to provide guidance to staff and customers to help minimize drought or water supply shortage impacts. The plan identifies drought action levels, appropriate agency responses, water demand reduction goals, and provides recommended demand management measures to assist customers in water conservation. The mandatory reduction measures implemented through this plan are designed to preserve minimal supplies for public health and safety. Mandatory reduction stages will trigger the formation of the Drought Hardship Committee whose purpose is to review hardship applications and determine whether additional water can be provided to the applicants with an economic hardship and/ or those utilizing best management practices.

Nevada Irrigation District Public Safety Plan

The purpose of the Public Safety Plan is to describe the hazards that exist at or near hydropower facilities and operations, and the safety devices or other measures that are employed to enhance the protection of the public that utilize the Nevada Irrigation District's (NID) Yuba-Bear, Scotts Flat, and Combie Hydroelectric Projects (Projects) land and water. The Federal Energy Regulatory Commission (FERC) is primarily concerned with the hazards created by Project structures and operations. However, hazards created by natural conditions in Project waters and at recreational areas operated or leased by licensees of hydropower projects are equally important. The Projects are a series of dams, reservoirs, forebays, afterbays, tunnels, pipelines, conduits, powerhouses, transmission lines, roads, and structures needed to operate and maintain the District's facilities. The purpose of the Projects is to store and provide water for irrigation and domestic use and to generate electrical power as a secondary use.

Because the dams, reservoirs, roads and other features are located in a mountainous area that has great attraction for recreation, these Project facilities also serve as recreational facilities. However, the primary purpose of each of these facilities is to supply water to downstream users. Thus, while the primary purpose is to provide water and power, recreational use of the facilities is an important part of operations, and great effort is put into making this use as safe as possible while still meeting Project goals and commitments.

NID is committed to public safety. The District will continue to regularly review their current operating procedures, and where applicable and practical, modify them to improve safety within the Projects.

Continuity of Operations Plan

This Plan provides guidance to NID and will ensure essential functions and services are maintained during an influenza pandemic. This Plan neither replaces nor supersedes any current, approved continuity plan; rather it supplements it, bridging the gap between traditional, all-hazards continuity planning and the specialized continuity planning required for a pandemic by addressing additional considerations, challenges, and elements specific to the dynamic nature of a pandemic. This Plan stresses that essential functions will be maintained during a pandemic outbreak through mitigation strategies, such as social distancing, increased hygiene, the vaccination of employees and their families, and similar approaches. Influenza may not, in itself, require a traditional continuity response, such as partial or full relocation of the organization's essential functions, although this response may be concurrently necessary due to other circumstances.

Covid-19 Prevention Plan, CPP

This CPP is designed to control exposures to the SARS-CoV-2 virus that may occur in our workplace. This CPP lives within the Codes of Safe Work Practices in the Injury and Illness Prevention Program (IIPP). The General Manager or appointee has overall authority and responsibility for implementing the provisions of this CPP in our workplace. In addition, all managers and supervisors are responsible for implementing and maintaining the CPP in their assigned work areas and for ensuring employees receive answers to questions about the program in a language they understand. All employees are responsible for using safe work practices, following all directives, policies and procedures, and assisting in maintaining a safe work environment.

Injury and Illness Prevention Program

It is the policy of the Nevada Irrigation District to provide a safe and healthful work environment for all of its employees – an environment that is absent of recognized hazards that may cause, death or serious physical harm to its employees. In an effort to achieve this goal, the District maintains an Injury and Illness Prevention Program that conforms to the best safe practices. A collectively involved and consulted workforce contributes to a work environment where health and safety are core values. NID has a basic responsibility to make the safety of employees a primary objective; at the same time, workers have a right to work in places where all risks to their health and safety are properly controlled. The successful operation of the District depends not only on service to the public, but also how safely each job is performed.

J.6.2. Administrative/Technical Mitigation Capabilities

NID is governed by a five-member Board of Directors, elected to four-year terms by District voters. The board is the District's policy-making body and policy is carried out by approximately 185 full- and part-time employees. Members of the board are elected from within and represent five geographical divisions within the District. As a state agency, NID operates under rules and regulations adopted under authority conferred by the California Water Code. NID is headquartered at an 18-acre site located on West Main Street in Grass Valley. The District also operates a maintenance yard on Gold Hill Road near Lincoln and a Hydroelectric Department office off Interstate 80 near Colfax. Table J-14 identifies the District department(s) responsible for activities related to mitigation and loss prevention in NID.

Table J-14 NID's Administrative and Technical Mitigation Capabilities

Administration	Y/N	Describe capability Is coordination effective?
Planning Commission	Y	Planning a collaboration between the Districts Engineering, Operations, Maintenance and Hydroelectric Departments
Mitigation Planning Committee	Y	Mitigation Planning is a function of the planning team listed above
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Yes	The District has a fully staffed water operations maintenance and hydroelectric maintenance divisions with approximately 90 dedicated positions to keep facilities in proper order.
Mutual aid agreements	Yes	The District has mutual aid agreements with many neighboring agencies including, PG&E, PCWA, City of Grass Valley, City of Nevada City, and Placer County.
Other		
Staff	**Y/N FT/PT**	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	N/A	
Floodplain Administrator	N/A	
Emergency Manager	Yes	The District has a risk manager that will act as an emergency manager during an emergency. Table top emergency exercises are practiced with multiple agencies every 5 years. The Districts Management team has completed NIMS training
Community Planner		
Civil Engineer	Yes	The District has an in house engineering department with a staff of 6 licensed engineers trained in all aspects of District functions.
GIS Coordinator	Yes	The District has a drafting division that maintains the Districts GIS system. The group has coordinated with outside agencies during emergencies to provide mapping information.
Other		
Technical		

Warning systems/services (Reverse 911, outdoor warning signals)	Yes	The District has electronic warning systems for its dams, water treatment plants and canals. Facilities are manned or monitored on a 24 hour a day 7 day a week basis. The District also utilizes an answering service as backup.
Hazard data and information	Yes	The District maintains a current SDS data base
Grant writing	Yes	The District has an in house grant writer
Hazus analysis		
Other		
How can these capabilities be expanded and improved to reduce risk?		
Continued vigilance and a prioritization of safety and risk management will continue into the future. The District has developed its own safety department and is in the process of updating its Emergency Response Plan, and Vulnerability Assessment.		

Source: NID

J.6.3. Fiscal Mitigation Capabilities

Table J-15 identifies financial tools or resources that the District could potentially use to help fund mitigation activities.

Table J-15 NID's Fiscal Mitigation Capabilities

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
General Property Taxes	Yes	The District receives annual allocations of County Property taxes which are predominantly used for capital improvement projects and debt service.
Authority to levy taxes for specific purposes	Yes	The District levies taxes for the Cement Hill Community Facility District and Rodeo Flat Assessment District
Fees for water, sewer, gas, or electric services	Yes	Fees are set based on cost of service every 5 years
Capacity fees for system expansion	Yes	The District receives capacity fees used to expand the water system
Storm water utility fee	No	
Incur debt through revenue bonds and/or special tax bonds	Yes	Revenue Bonds and special taxes have both been utilized to fund projects within the District
Incur debt through private activities	No	
Community Development Block Grant	No	
Other federal funding programs	Yes	The District has been the recipient of Depart. of Water Resources grant funding
State funding programs	Yes	State Revolving Loan Funding
Other		

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
How can these capabilities be expanded and improved to reduce risk?		
A dedicated resource planning division level of staffing would greatly improve NID's ability to increase vulnerability awareness and help plan for future mitigation programs.		

Source: NID

J.6.4. Mitigation Education, Outreach, and Partnerships

Table J-16 identifies education and outreach programs and methods already in place that could be/or are used to implement mitigation activities and communicate hazard-related information.

Table J-16 NID's Mitigation Education, Outreach, and Partnerships

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Yes	The District works with Multiple NGO's that focus on watershed protection such as: SYRCL, Bear Yuba Land Trust and others that could help spread the word during emergency
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Yes	The District has a dedicated Water Efficiency Staff and a Public Information Team to help spread the water conservation message
Natural disaster or safety related school programs	N/A	
StormReady certification	N/A	The District has a storm water action plan in place that is implemented during forecasted heavy storms
Firewise Communities certification	N/A	
Public-private partnership initiatives addressing disaster-related issues	N/A	
Other		
How can these capabilities be expanded and improved to reduce risk?		
Ongoing communication and coordination throughout traditional and social media platforms.		

Source: NID

J.6.5. Other Mitigation Efforts

The District has many other completed or ongoing mitigation efforts that include the following:

- Updated Coordinated Operating Agreement with PG&E
- NID Regional Water Supply Project
- Cole Siphon Replacement Project
- Rock Creek Bypass Encasement Project
- Lincoln Canal Encasement Project

- North Auburn Highway 49 Transmission Project
- North Auburn Treatment Plant VFD's and Permanent Backup Generator
- Permanente generator installation at headquarters office
- Purchased additional portable generators
- Combie Phase 1 Replacement Project

In addition, acutely hazardous chlorine gas has been removed at all the Districts Water Treatment Plants. The District has switched to bleach to lessen the hazard level to the neighboring residences.

Development of interties between NID & PCWA to allow for multi-agency coordination and backup water supply. PCWA and the District have four interties that are utilized for maintenance and emergency activities. Additionally, the District has completed an emergency intertie with PG&E that will allow for an additional delivery point of raw water for both NID and PCWA. Water agreements between NID, PCWA and Placer County ensure ongoing water supply for the Placer County Government Center in Auburn.

J.7 Mitigation Strategy

J.7.1. Mitigation Goals and Objectives

The NID adopts the hazard mitigation goals and objectives developed by the HMPC and described in Chapter 5 Mitigation Strategy.

J.7.2. Mitigation Actions

The planning team for the NID identified and prioritized the following mitigation actions based on the risk assessment. Background information and information on how each action will be implemented and administered, such as ideas for implementation, responsible office, potential funding, estimated cost, and timeline are also included. The following hazards were considered a priority for purposes of mitigation action planning:

- Avalanche
- Dam Failure
- Drought & Water Shortage
- Earthquake
- Floods: 1%/0.2% annual chance
- Floods: Localized Stormwater
- Landslides, Mudslides, and Debris Flows
- Levee Failure
- Severe Weather: Freeze and Snow
- Severe Weather: Heavy Rains and Storms
- Tree Mortality
- Wildfire

It should be noted that many of the projects submitted by each jurisdiction in Table 5-4 in the Base Plan benefit all jurisdictions whether or not they are the lead agency. Further, many of these mitigation efforts are collaborative efforts among multiple local, state, and federal agencies. In addition, the countywide public outreach action, as well as many of the emergency services actions, apply to all hazards regardless

of hazard priority. Collectively, this multi-jurisdictional mitigation strategy includes only those actions and projects which reflect the actual priorities and capacity of each jurisdiction to implement over the next 5-years covered by this plan. It should further be noted, that although a jurisdiction may not have specific projects identified for each priority hazard for the five year coverage of this planning process, each jurisdiction has focused on identifying those projects which are realistic and reasonable for them to implement and would like to preserve their hazard priorities should future projects be identified where the implementing jurisdiction has the future capacity to implement.

Multi-Hazard Actions

Action 1. 2015 Agricultural Water Management Plan – Updated 2021

Hazards Addressed: Climate Change, Drought and Water Storage Hazards, Agricultural Hazards

Goals Addressed: 1, 2, 3, 4, 5, 7

Issue/Background: The Agricultural Water Management Planning Act requires all agricultural water suppliers that provide water to 10,000 or more irrigated acres to adopt and submit an AWMP to the California Department of Water Resources (DWR). The purpose of the Act is to evaluate water use and applicable management practices to make the best use of available resources. The District's AWMP also addresses the new AWMP requirements established by the Governor in Executive Order B-29-15 (April 1, 2015), and listed below.

- Prepare a Drought Management Plan that describes the actions and measures the supplier will take to manage water demand during drought; and,
- Quantify water supplies and demands for 2013, 2014, and 2015, to the extent data is available.

Project Description: This AWMP addresses the District's water system and includes a description of the service area, water uses, water resources, and a comparison of water supply and water demands during the planning cycle (2011 through 2015). Also described are the District's water supply reliability, water use efficiency information, water shortage allocation policies, and Drought Management Plan. This AWMP is the year 2015 AWMP as required by the Agricultural Water Management Planning Act (Act) (California Water Code Section 10820(a)), which requires all agricultural water suppliers that provide water to 10,000 or more irrigated acres within their service area to prepare an AWMP.

Other Alternatives:

Ex**isting Planning Mechanism(s) through which Action Will Be Implemented**: Plan For Water, Raw Water Master Plan

Responsible Agency/ Department/Partners: NID

Cost Estimate: Various

Benefits (Losses Avoided): Reduced risk to ag hazards.

Potential Funding: NID - Grants

Timeline: Within 2021

Project Priority (H, M, L): Medium

Action 2. Avalanche Mitigation

Hazards Addressed: Avalanche

Goals Addressed: 1, 2, 3, 4, 5, 7

Issue/Background: Nevada Irrigation District has critical water supply facilities in the high alpine watershed that supply a majority of the District's annual water needs. These facilities are located in remote, steep terrain that is subject to avalanche during heavy winters. The primary danger with an avalanche is the potential for blockage of canals and damage to the many elevated flumes relied upon for conveyance. Heavy snow in the early 1990's blocked water flow in the South Yuba Canal and created constraints on the Districts water delivery system. Emergency pumps were brought in to pump water from Scotts Flat as a backup while the snow was cleared. The District is currently working on a permanent pumping facility as an emergency backup supply should future heavy snows or avalanches damage District facilities.

Project Description: Purchase new SnoCat and tracked UTV to improve access options. Install and provide telemetry from two new snow measurement station in Upper Division. Install and provide telemetry from two new weather stations in the Upper Division

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: No existing mechanism.

Responsible Agency/ Department/Partners: Nevada Irrigation District, California Department of Water Resources, Sierra Avalanche Center

Cost Estimate:

- SnoCat = $225,000
- Tracked UTV = $30,000
- Snow Measurement Stations = $75,000
- Weather Stations = $10,000

Benefits (Losses Avoided): Improved worker safety during snow events

Potential Funding:

Timeline: 1-5 years

Project Priority (H, M, L): Medium

Action 3. Canal Culvert Replacement Program

Hazards Addressed: Water Supply Reliability, Flood Control

Goals Addressed: 1, 2, 3, 4, 5, 7

Issue/Background: Canal Crossings are facilitated with numerous culverts throughout the Placer County area. These culverts are often undersized, aged, and failing. During heavy rain events these culverts backup water causing flooding and overtopping of the canal upstream of the culvert. Overtopping often results in erosion of the canal berm and presents possible property damage. Nevada Irrigation District is currently engaged in a culvert replacement project aimed at resolving these issues.

Project Description: Removal and replacement of culverts and headwalls within District canals.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: The Nevada Irrigation Districts Engineering and Encroachment Departments provide oversite on these projects

Responsible Agency/ Department/Partners: Nevada Irrigation District and associated property owners

Cost Estimate: Varies per year, some projects paid for by private parties. While cost estimates varies based on size and location, average cost of culvert install is $20,000.

Benefits (Losses Avoided): Life, Safety, Localized Flooding, Reduction in loss of private property

Potential Funding: District funding, grants

Timeline: ongoing

Project Priority (H, M, L): Medium

Action 4. Centennial Water Supply Project

Hazards Addressed: Water Supply Reliability, Climate Change, Flood Control Protection, Power Outages

Goals Addressed: 1, 2, 3, 4, 5, 7

Issue/Background: The Nevada Irrigation District is embarking on a regional water storage and supply reliability project known as Centennial Water Supply Project. The proposed project includes a water storage reservoir between Rollins and Combie Lakes. The project is necessary to bolster water supply for the surrounding regions to help combat prolong drought, future demand needs. The project will also provide environmental benefits.

Project Description: Construct Roller Compacted Concrete Dam that will impound 110,000 ac-ft reservoir on the Bear River for water supply.

Other Alternatives: Conservation, and water use restrictions

Existing Planning Mechanism(s) through which Action Will Be Implemented: The District has just begun studying this proposed project. Currently feasibility and environmental studies are under way.

Responsible Agency/ Department/Partners: Nevada Irrigation District

Cost Estimate: 300-400 Million Dollars

Benefits (Losses Avoided): Regional water supply reliability including protection from long term drought and climate change, clean renewable power generation, and environmental benefits are a small sample of some of the highlights this project will bring forward.

Potential Funding: Still being researched, District Funding, Grants

Timeline: 10+ years

Project Priority (H, M, L): Currently low as the District focuses on Plan for Water process.

Action 5. Combie Phase 1 Replacement

Hazards Addressed: Water Supply Reliability, Flood Control, Earthquake Vulnerability

Goals Addressed: 1, 2, 3, 4, 5, 7

Issue/Background: A majority of the water that supplies Placer County properties within the Nevada Irrigation District flows through the Combie Phase 1 Canal. The Canal has reached its life expectancy and is experiencing leakage and structural issues. The concrete flume sections are separating and the general condition of the concrete is failing. The District is the beginning stages of design for the replacement of the open canal with a pipe. This project includes the replacement of the elevated siphon crossing the Bear River. This facility has had experienced failures in the recent past that caused flood damage and extended water outages for the northern portions of Placer County.

Project Description: Removal and replacement of 54-inch aerial siphon and replace 9100 feet of concrete flume with 96-inch Reinforced Concrete Pressure Pipe.

Other Alternatives: No other financially feasible option exists.

Existing Planning Mechanism(s) through which Action Will Be Implemented: The District has completed the 54-inch aerial siphon and it is in service. Construction began for the installation of the 96-inch RCCP in 2019 and will be completed in 2021.

Responsible Agency/ Department/Partners: Nevada Irrigation District

Cost Estimate: Approximately $27 million.

Benefits (Losses Avoided): Associated property damage and loss of water supply to the entire Placer County region and two water treatment plants.

Potential Funding: Bonds and District Capital

Timeline: Will be finished in 2021

Project Priority (H, M, L): High

Action 6. Continuity of Operations Plan

Hazards Addressed: Pandemic

Goals Addressed: 1, 2, 3, 4, 5, 7

Issue/Background: Organizations across the Nation perform essential functions and services that may be adversely affected in the event of a natural or man-made disaster. In such events, the Nevada Irrigation District (NID/District) will have continuity plans to assist in the continuance of their essential functions. Continuing to perform essential functions and provide essential services is vital to NID's ability to remain a viable entity during times of increased threats from all hazards, manmade or natural. Since the threat to an organization's continuity of operations is great during a pandemic outbreak; it is important for organizations, in particular the Nevada Irrigation District, to have a Continuity of Operations Plan for Pandemic Influenza (Plan) in place to ensure it can carry out its essential functions and services. While organizations may be forced to suspend some operations due to the severity of a pandemic outbreak, an effective Plan will assist NID in its efforts to remain operational, as well as strengthen the ability to resume operations.

Project Description: This Plan provides guidance to NID and will ensure essential functions and services are maintained during an influenza pandemic. This Plan neither replaces nor supersedes any current, approved continuity plan; rather it supplements it, bridging the gap between traditional, all-hazards continuity planning and the specialized continuity planning required for a pandemic by addressing additional considerations, challenges, and elements specific to the dynamic nature of a pandemic. This Plan stresses that essential functions will be maintained during a pandemic outbreak through mitigation strategies, such as social distancing, increased hygiene, the vaccination of employees and their families, and similar approaches. Influenza may not, in itself, require a traditional continuity response, such as partial or full relocation of the organization's essential functions, although this response may be concurrently necessary due to other circumstances.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Injury and Illness Prevention Plan

Responsible Agency/ Department/Partners: NID

Cost Estimate: To be determined.

Benefits (Losses Avoided): Continued performance of essential functions

Potential Funding: NID - Grants

Timeline: 1-5 years

Project Priority (H, M, L): H

Action 7. Pandemic Planning

Hazards Addressed: Covid 19 Prevention Plan

Goals Addressed: 1, 2, 3, 4, 5, 7

Issue/Background: The General Manager or appointee has overall authority and responsibility for implementing the provisions of this CPP in our workplace. In addition, all managers and supervisors are responsible for implementing and maintaining the CPP in their assigned work areas and for ensuring employees receive answers to questions about the program in a language they understand. All employees are responsible for using safe work practices, following all directives, policies and procedures, and assisting in maintaining a safe work environment.

Project Description: This CPP is designed to control exposures to the SARS-CoV-2 virus that may occur in our workplace. This CPP lives within the Codes of Safe Work Practices in the Injury and Illness Prevention Program (IIPP).

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Injury and Illness Prevention Planning

Responsible Agency/ Department/Partners: NID

Cost Estimate: Various

Benefits (Losses Avoided): Employee and Agency health and resiliency

Potential Funding: NID - Grants

Timeline: Currently in place

Project Priority (H, M, L): H

Action 8. Dam Failure Mitigation

Hazards Addressed: Dam Failure

Goals Addressed: 1, 2, 3, 4, 5, 7

Issue/Background: A dam failure can range from a small uncontrolled release to a catastrophic failure, caused by prolonged rainfall and flooding. The primary danger associated with dam failure is the high velocity flooding of those properties downstream of the dam. Dam failure flooding varies by area depending on which dam fails and the nature and extent of the dam failure and associated flooding. The district's highest dam is the rock fill-earth core dam at Rollins Reservoir, built in 1965 and standing 242 feet tall. The Jackson Meadows dam (1965) is second highest at 195 feet, Scotts Flat dam (1965) is 175 feet, and the Bowman South Arch dam (1925) is 171 feet high. French Dam, constructed in 1858-59, is the district's oldest dam still in use. Based on analysis provided in the Placer County General Plan Background Report, only five dams within Placer County have the potential to affect more than 100 persons: Folsom Dikes No. 5 & 6; Lake Tahoe Dam; Camp Far West Dam; Lake Combie Dam; and Rollins Reservoir Dam. Of these five, a failure of Rollins Reservoir or Combie Dams could potentially impact areas within the NID. Failure of Dutch Flat Forebay could also potentially impact services provided by NID, albeit in a limited capacity.

Project Description: Van Giesen Dam (Combie Lake) Stabilization and Scour Protection – Construct improvements necessary to stabilize dam and protect against scour during extreme flood events. Combie South Powerhouse Access Improvements – Construct improved access to powerhouse for safety and security.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Dam EAPs

Responsible Agency/ Department/Partners: Nevada Irrigation District, California Department of Water Resources Division of Safety of Dams, and Federal Energy Regulatory Commission.

Cost Estimate:

- Dam Improvements: $13,287,000
- Road Improvements: $150,000

Benefits (Losses Avoided): Loss of life in the event of a dam failure.

Potential Funding: CA DWR, Cal OES, FEMA, and other grant funding sources.

Timeline: When funding is available

Project Priority (H, M, L): Medium

Action 9. Water Conservation and Drought Preparedness

Hazards Addressed: Drought & Water Storage

Goals Addressed: 1, 2, 3, 4, 5, 7

Issue/Background: The impact of a drought on the District is primarily one of water supply. Most water provided by the NID comes from snowmelt from the high mountain watershed. A multiple year drought can severely compromise the water supply within the district. The District experienced below average

precipitation and minimal snowpack from 2012 to 2015 and again from 2017 to 2020. Current precipitation conditions are below average as well. In 2014 the District recorded a snowpack reading of 5% of average, the lowest snowpack reading since it began collecting this data in 1921. Governor Brown declared a state of emergency and the State Water Resources Control Board restricted water use and curtailed many of the Districts water rights. The limited water supply along with the States mandated actions necessitated the enactment of the Districts Drought Contingency Plan. Some of the action items from the plan include: limiting and or suspending additional Ag water sales, mandatory treated water reductions, and the establishment of a water waste reporting program. The District has proactively managed its water resources in preparation for additional dry years. In addition to conservative water management, the District also purchased supplemental waters from neighboring agencies to help bolster water supply. After 2 years of below-average rainfall and very low snow-melt run off, Governor Schwarzenegger in June of 2008 declared a state of emergency for drought conditions statewide. The final California Department of Water Resources showed snowpack water content at only 67 percent of normal. The 1991-1992, drought also severely impacted the District and other areas of Placer County and surrounding California foothills. A severe drought that affected the District and all of California is the drought of 1977-1978. This drought was severe enough to trigger implementation of the District's Drought Contingency Plan at the most restrictive level – that of mandatory rationing and reduction in service to irrigation customers up to 50%. With the unknowns of drought and globally changing climate conditions, NID, more than ever, is promoting water conservation and expansion of liquid storage. In addition to water storage concerns, prolonged drought is contributing to the success of forest pests, such as the pine bark beetle, which is leading to heightened levels of tree mortality. These high levels of mortality are costly to mitigate, and pose a serious risk to facilities and visitors to NID-owned campgrounds.

Project Description: NID prioritizes projects to increase water system efficiency, and also to make forested watersheds more resilient to drought. Reduce understory and selectively thin forested watershed lands to increase surface runoff, snowpack accumulation and reduce loss through evapotranspiration. Reducing competition in forest stands can help increase the resiliency of remaining trees to disturbances such as drought. Invest in enhancement of wet meadow environments on open watershed lands to provide late summer flows, attenuate runoff, and reduce evaporative loss.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Draft District Forest Management Plan, English Meadow Forest Management Plan, CABY IRWM Project List

Responsible Agency/ Department/Partners: Nevada Irrigation District; CABY

Cost Estimate: $5 million

Benefits (Losses Avoided): Increase water availability via thinning of overstocked forest stands in addition to reduced loss from evapotranspiration. Decreased mortality in well-managed tree stands with healthy forest conditions.

Potential Funding: CAL FIRE, Sierra Nevada Conservancy, CABY IRWM Grants

Timeline: Annual

Project Priority (H, M, L): H

Action 10. Drought Contingency Plan

Hazards Addressed: Drought, Climate Change

Goals Addressed: 1, 2, 3, 4, 5, 7

Issue/Background: The mandatory reduction measures implemented through this plan are designed to preserve minimal supplies for public health and safety. Mandatory reduction stages will trigger the formation of the Drought Hardship Committee whose purpose is to review hardship applications and determine whether additional water can be provided to the applicants with an economic hardship and/ or those utilizing best management practices.

Project Description: The purpose of the Nevada Irrigation District's Drought Contingency (Plan) is to provide guidance to staff and customers to help minimize drought or water supply shortage impacts. The plan identifies drought action levels, appropriate agency responses, water demand reduction goals, and provides recommended demand management measures to assist customers in water conservation.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: NID Drought Contingency Plan

Responsible Agency/ Department/Partners: NID

Cost Estimate: Various

Benefits (Losses Avoided): See Plan

Potential Funding: NID - Grants

Timeline: Current

Project Priority (H, M, L): H

Action 11. Flood Mitigation

Hazards Addressed: Flood, Localized Flood, Heavy Rains and Storms

Goals Addressed: 1, 2, 3, 4, 5, 7

Issue/Background: Flooding and soil erosion due to heavy rains and snow runoff have been a historical problem throughout Placer County. Abundant snowfall in the mountains combined with rain and steep terrain can mean rapid runoff and flooding. Water flow can be high in peak runoff periods with historical downstream flooding. The primary impacts from flooding within the district include damage to roads, utilities, bridges; and flooding of homes, businesses and critical facilities. Flooding has also caused canals

to overtop and erosion of the canal levees. The most recent flood event to impact the District is the late December floods of 2005. Excessive rain for a prolonged period caused severe flooding in the Sierra foothills, in and around Placer County. Impacts included damage to the District's canal system as well as damage to roads and properties throughout District boundaries. Heavy prolong precipitation in late 1996 caused flood damage across much of the District's service area. President Clinton proclaimed the area a disaster area while Governor Wilson followed suit. Many of the Districts main diversion dams and canals were washed out. Over 50 applications for flood damage assistance for the repair of NID facilities were submitted to FEMA and Cal OES.

Project Description: Improvement of District remote sensing equipment, Supervisory Control and Data Acquisition (SCADA) system, and communication network. Components include software upgrades, hardware upgrades, and new communication tower construction.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented:

Responsible Agency/ Department/Partners: Nevada Irrigation District

Cost Estimate: $750,000.

Benefits (Losses Avoided): Improved forecasting, real time monitoring field conditions.

Potential Funding: CAL OES, FEMA, CA DWR Grants

Timeline: Within 5 years

Project Priority (H, M, L): Medium

Action 12. Healthy Forest Management and Wildfire Mitigation Plan

Hazards Addressed: Tree Mortality, Wildfire, High Winds

Goals Addressed: 1, 2, 3, 4, 5, 6, 7

Issue/Background: NID owns nearly 6,000 acres of forested land, generally located in borders around storage reservoirs and in scattered parcels where District infrastructure is located. Strategic forest management is therefore necessary for the District and those that rely on its water supply for the protection of source water, the water system, ecosystem values, and human health and property. The past 30 years of reduced logging and over a century of suppressing the frequent, low to moderate-intensity fire cycles with which local forest communities evolved, has led to overcrowded forest conditions that are at-risk of unnaturally severe wildfire (CAL FIRE). Significant competition for resources such as water and sunlight place stress on individual trees and forest communities and decrease the ability of the forest to defend itself from pests and diseases. This accumulation of understory vegetation, coupled with increased stress and pest presence can lead to significant tree mortality; further exaggerating the issue of extreme wildfire risk. When

the ignition risk associated with WUI residents and the campgrounds that NID owns is factored in, the potential for a catastrophic wildfire becomes very high.

Project Description: The goals of the District's Watershed Program are:

"The protection of residents, visitors, and District infrastructure from wildfire and hazard trees" and "the protection and improvement of District forest land for the health of the watershed and associated ecosystem services, including water supply, recreation, soil retention, and carbon sequestration."

This plan is intended to provide management guidelines that include: an overview of the District's forest land, forest issues, program objectives and action items, and supporting information. The priority objectives of the District's forestry program involve significantly reducing the risk of wildfire ignition and hazardous trees around storage reservoirs, hydroelectric and treatment facilities, water conveyance infrastructure and within recreation areas, where risks to human health and safety, water supply, and system operation are highest.

This plan is intended to inform and support District staff as they plan and implement forest and vegetation management projects. It provides context and related literature to support increased understanding by staff that will utilize these recommendations and Managers and District Board Members who will oversee our programs and set direction as we move forward. This plan also can be shared with partners at Nevada County, Consolidated Fire, CAL FIRE, and other local organizations that are working towards our collective goals for safer communities, reduced wildfire risk and severity, and long-term water resource protection.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: This action creates a planning mechanism.

Responsible Agency/ Department/Partners: NID

Cost Estimate: To be determined

Benefits (Losses Avoided): Reduced wildfire risk to people and property.

Potential Funding: NID - Grants

Timeline: Within 5 years

Project Priority (H, M, L): H

Action 13. Forest Resilience Program

Hazards Addressed: Climate Change

Goals Addressed: 1, 2, 3, 4, 5, 7

Issue/Background: Climate models predict that the Sierra Nevada Region will experience warming average annual temperatures ranging from an increase of 2°F - 4°F in the winter and 4°F - 8°F in the summer by the end of the century. This shift to a warmer climate is expected to have wide ranging effects on the annual weather conditions, snowfall, forest health, water availability, and wildfire. One of the most concerning impacts of climate change on the District is reduced forest resilience and the projected decrease in annual snowpack accumulation due to the transition of average annual precipitation from snow to rain caused by increasing temperatures. As a headwaters region, snowpack is the largest source of storage within the NID system, and the series of reservoirs rely heavily on the timed release of water in snowpack to recharge reservoirs into the late summer when rain no longer falls. Actively managing forested landscapes can help NID address climate change impacts, prepare for the future, and reduce risks (such as severe wildfire) that are exacerbated by a warmer climate.

Project Description: Forest thinning and selective harvest projects to reduce forest stand density and accumulated fire fuels, thereby reducing risk of extreme and carbon intensive wildfire. Understory thinning also decreases stress in the residual stand, leading to increased carbon sequestration rates, les liquid water loss to evapotranspiration, and increased pest resistance. Creating areas where snowfall can reach to the forest floor promotes prolonged snowpack and increased accumulation greater than areas where dense vegetation prevents optimal snowpack.

Other Alternatives: Carbon emission reduction strategies

Existing Planning Mechanism(s) through which Action Will Be Implemented: Draft District Forest Management Plan

Responsible Agency/ Department/Partners: Nevada Irrigation District

Cost Estimate: Forest Thinning: $2,000 - $3,000 per acre

Benefits (Losses Avoided): Increased snowpack accumulation, increased carbon sequestration rates, increased water availability, increased habitat resilience to possible disturbance, decreased risk of wildfire

Potential Funding: Sierra Nevada Conservancy, CAL FIRE, Wildlife Conservation Board.

Timeline: Annual

Project Priority (H, M, L): H

Action 14. Injury and Illness Prevention Program

Hazards Addressed: Pandemic

Goals Addressed: 1, 2, 3, 4, 5, 7

Issue/Background: A collectively involved and consulted workforce contributes to a work environment where health and safety are core values. NID has a basic responsibility to make the safety of employees a primary objective; at the same time, workers have a right to work in places where all risks to their health

and safety are properly controlled. The successful operation of the District depends not only on service to the public, but also how safely each job is performed.

Project Description: It is the policy of the Nevada Irrigation District to provide a safe and healthful work environment for all of its employees – an environment that is absent of recognized hazards that may cause, death or serious physical harm to its employees. In an effort to achieve this goal, the District maintains an Injury and Illness Prevention Program that conforms to the best safe practices.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Covid 19 Prevention Planning

Responsible Agency/ Department/Partners: NID

Cost Estimate: To be determined.

Benefits (Losses Avoided): Reduced risk to staff.

Potential Funding: NID - Grants

Timeline: Ongoing

Project Priority (H, M, L): Medium

Action 15. Public Safety Plan (FERC)

Hazards Addressed: Climate Change, Drought & Water Storage, Earthquake, Flood, Landslides, Severe Weather, Tree Mortality, Wildfire

Goals Addressed: 1, 2, 3, 4, 5, 7

Issue/Background: This Public Safety Plan complies with FERC's Guidelines for Public Safety at Hydropower Projects, dated March 1992 and updated November 29, 2011.

The purpose of the Public Safety Plan is to describe the hazards that exist at or near hydropower facilities and operations, and the safety devices or other measures that are employed to enhance the protection of the public that utilize the Nevada Irrigation District's (NID) Yuba-Bear, Scotts Flat, and Combie Hydroelectric Projects (Projects) land and water. The Federal Energy Regulatory Commission (FERC) is primarily concerned with the hazards created by Project structures and operations. However, hazards created by natural conditions in Project waters and at recreational areas operated or leased by licensees of hydropower projects are equally important.

Project Description: The Projects are a series of dams, reservoirs, forebays, afterbays, tunnels, pipelines, conduits, powerhouses, transmission lines, roads, and structures needed to operate and maintain the District's facilities. The purpose of the Projects is to store and provide water for irrigation and domestic use and to generate electrical power as a secondary use.

Because the dams, reservoirs, roads and other features are located in a mountainous area that has great attraction for recreation, these Project facilities also serve as recreational facilities. However, the primary purpose of each of these facilities is to supply water to downstream users. Thus, while the primary purpose is to provide water and power, recreational use of the facilities is an important part of operations, and great effort is put into making this use as safe as possible while still meeting Project goals and commitments.

NID is committed to public safety. The District will continue to regularly review their current operating procedures, and where applicable and practical, modify them to improve safety within the Projects.

Other Alternatives: No action.

Existing Planning Mechanism(s) through which Action Will Be Implemented:

Responsible Agency/ Department/Partners: Nevada Irrigation District

Cost Estimate: To be determined.

Benefits (Losses Avoided): Identifies hazards near hydropower facilities and operations. Describes safety devices and safety measures. Describes operational controls and inspection and maintenance. Regulatory compliance.

Potential Funding: NID or Grants

Timeline: On-going

Project Priority (H, M, L): Medium

Action 16. North Auburn Treatment Plant VFD's and Permanent Backup Generator

Hazards Addressed: Water Supply Reliability, Wildfire, Earthquake Vulnerability

Goals Addressed: 1, 2, 3, 4, 5, 6, 7

Issue/Background: The North Auburn Treatment Plant has been impacted by loss of power by PSPS events as well as wildfires. The need is to install a permanent backup generator to allow the treatment plant to continue to operate and supply treated water and fire hydrants within the North Auburn service area.

Project Description: Replace the high-lift pumps motor control center, install VFD's and a permanent natural gas driven backup generator that can run the water treatment plant.

Other Alternatives: No other financially feasible option exists.

Existing Planning Mechanism(s) through which Action Will Be Implemented: The District is currently in design of the improvements. Construction scheduled to be completed in 2022.

Responsible Agency/ Department/Partners: Nevada Irrigation District

Cost Estimate: Approximately $600,000.

Benefits (Losses Avoided): Reduces/eliminates potential loss of treated water supply to the entire North Auburn Treatment Plant Service area.

Potential Funding: District Capital

Timeline: Will be finished in 2022

Project Priority (H, M, L): High

Action 17. Orr Creek Diversion

Hazards Addressed: Water Supply Reliability, Flood Control

Goals Addressed: 1, 2, 3, 4, 5, 7

Issue/Background: The Districts Orr Creek Diversion Structure was built in the early 1900's and has gone through a number of modifications and additions. The older portion of the structure is leaking and needs replacement. The proposed project would strengthen the diversion dam to guard against failure, repair leakage under the dam, and provide a discharge valve to allow for flow control below the dam. This facility is the lifeline to hundreds of acres of irrigated lands in Placer County. District is currently working on a District wide reservoir storage study that will help guide the District in developing strategies regarding existing reservoirs.

Project Description: Upgrade/Improve/Replace existing diversion structure or bypass around the facility and abandon.

Other Alternatives: Leave the facility as is or move the diversion to a different location.

Existing Planning Mechanism(s) through which Action Will Be Implemented: The District has included the Orr Creek Diversion in its capital improvement plan and is part of the District wide reservoir storage study currently being completed.

Responsible Agency/ Department/Partners: Nevada Irrigation District Engineering Department

Cost Estimate: $2,000,000

Benefits (Losses Avoided): The retrofit of the facility would provide the structural integrity to minimize potential dam failure. The project will provide water supply reliability to the many customers who receive water from this diversion structure. The installation of an outlet valve will allow the District to better control the waters that flow past the facility particularly during heavy precipitation events. Abandoning of the structure and constructing a new diversion upstream that would be better suited to handle flood events.

Potential Funding: District Funding, Grants

Timeline: 3 to 5 years

Project Priority (H, M, L): Medium priority. Project will progress as funding becomes available

Action 18. Owner's Dam Safety Program, Revision 3.0

Hazards Addressed: Climate Change, Drought and Water Storage, Earthquake, Flood, Landslides, Mudslides, Sever Weather, Wildfire, Tree Mortality

Goals Addressed: 1, 2, 3, 4, 5, 6, 7

Issue/Background: NID owns, operates, and maintains dams and the associated appurtenant works. Under normal circumstances, these assets produce hydroelectric power and water for consumptive and irrigation uses. Under adverse conditions, such as those related to hydrologic, geologic, and seismic hazards, these assets may pose a risk to lives and property. It is the objective of NID to mitigate these risks and maintain the long-term safe and reliable operation of these assets. It is the policy of NID to continue the safe operations of the dam inventory and associated appurtenant works, while maintaining compliance with all applicable laws and regulations.

The purpose of the Owner's Dam Safety Program (ODSP) is to manage the safety of the District dams and their ancillary facilities for the protection of life, property, and the environment. The ODSP is intended to ensure that NID's Board of Directors, Management, Chief Dam Safety Coordinator (CDSC), Dam Safety Engineer (DSE), dam operational, maintenance, and engineering staff, consultants, construction contractors, and other agents have a good understanding and constant awareness of the on-going need to watch for and improve the safety of the dams to ensure the safety of the public.

Project Description: This ODSP is applied to all the District Dams and the ancillary facilities under the jurisdiction of Federal Energy Regulatory Commission (FERC) or California Division of Safety of Dams (DSOD). These include FERC's Yuba-Bear Project (P-2266), Combie Dam Project (P-2981), Scotts Flat Dam Project (P-5930), and Loma Rica and Deer Creek Diversion Dams (both are DSOD jurisdiction only). The ODSP also applies to the spillways, penstocks, outlet structures, instruments, reservoirs, and stream beds associated with the dams.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented:

Responsible Agency/ Department/Partners: Nevada Irrigation District

Cost Estimate: To be determined.

Benefits (Losses Avoided): Mechanism to comply with regulatory standards. Mitigate risks to lives and property related to hydrologic, geologic, and seismic hazards associated with dams.

Potential Funding: NID or Grants

Timeline: On-going

Project Priority (H, M, L): Medium

Action 19. Raw Water Master Plan

Hazards Addressed: Drought, Climate Change, Flood, Severe Weather

Goals Addressed: 1, 2, 3, 4, 5, 7

Issue/Background: The Nevada Irrigation District's Plan for Water was last updated in 2005 and adopted in 2013. The plan helps guide decisions related to the water system over the next 50 years. Long range planning ultimately involves forecasting & projecting future conditions based on realistic, valid and supportive assumptions. Regardless of the technology, science, or process used, assumptions still must be made to produce a forecast.

Project Description: The District is updating the plan to reflect changes in water demand, supply and the potential effects of climate change. The plan is an organizational tool that seeks to align resource decision making with community values and District operational needs, including technical and cost criteria requirements. When complete the plan will show how a variety of future water supply and demand scenarios could be integrated to ensure our community enjoys the same high-quality, reliable water system we have now. The Plan for Water is born of the FERC relicensing effort, climate change impacts, financial requirements, and new regulatory requirements. The Plan for Water does not re-analyze or revisit any new requirements set by FERC or the State. Instead, it sets these requirements as the new normal, and looks ahead 50 years to anticipate potential supply/demand scenarios and identify alternative solutions

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Raw Water Master Plan 2011, 2015 Agricultural Water Management Plan – Updated in 2021, 2015 Urban Water Management Plan – Updated in 2021

Responsible Agency/ Department/Partners: NID

Cost Estimate: Various

Benefits (Losses Avoided): Reduced risk to drought and water shortage.

Potential Funding: NID - Grants

Timeline: Continuous

Project Priority (H, M, L): Medium

Action 20. Raw Water Replacement Program

Hazards Addressed: Water Supply Reliability, Flood Control, Levee Failure, Drought and Water Shortage

Goals Addressed: 1, 2, 3, 4, 5, 6, 7

Issue/Background: There are raw water facilities (canals) throughout the Placer County area. These canals are often aged, leaking or undersized. During heavy rain events these canals can backup water causing flooding and overtopping of the canal. Leaking and overtopping often results in erosion of the canal berm and presents possible property damage. Leaking canals also can exasperate water shortages during drought. Nevada Irrigation District is currently engaged in a raw water replacement program that is budgeted annual and aimed at resolving these issues.

Project Description: Encasement and lining of District canals and replacement/upgrades of existing canal structures/pipelines.

Other Alternatives:

Existing Planning Mechanism(s) through which Action Will Be Implemented: The Nevada Irrigation Districts Engineering Department and Maintenance Department provides oversite on these projects.

Responsible Agency/ Department/Partners: Nevada Irrigation District

Cost Estimate: Minimum of $1,000,000 annually. Budgets for this program varies per year based on projects identified.

Benefits (Losses Avoided): Life, Safety, Localized Flooding, Reduction in loss of private property, improved efficiency of water supply deliveries

Potential Funding: District funding, grants

Timeline: Ongoing

Project Priority (H, M, L): Medium

Action 21. Reservoir Cleaning

Hazards Addressed: Water Supply Reliability, Flood Control

Goals Addressed: 1, 2, 3, 4, 5, 7

Issue/Background: Large onstream reservoirs and small reservoirs located within the canal system are filling with sediment from continued years of use. Adequate reservoir storage is very beneficial during storms and heavy rain. As the reservoir accumulates sediment, water storage is reduced and the ability to regulate water efficiency is diminished. Reduced reservoir storage in the small reservoirs can result in upstream canal overtopping and property damage. District is currently working on a District wide reservoir storage study that will help guide the District in developing strategies regarding this complex issue.

Project Description: Removal of sediment with existing District reservoirs.

Other Alternatives: Watershed mitigation, sediment basins

Existing Planning Mechanism(s) through which Action Will Be Implemented: The Nevada Irrigation Districts Engineering and Maintenance Departments provide oversite on these projects.

Responsible Agency/ Department/Partners: Nevada Irrigation District

Cost Estimate: Removal of sediment in District reservoirs would exceed $150,000,000

Benefits (Losses Avoided): Water Quality, Water storage and prevention of property damage

Potential Funding: District Funding, Grants

Timeline: Ongoing

Project Priority (H, M, L): Medium

Action 22. Resilient Headwaters Forests

Hazards Addressed: Severe Weather Extreme Heat

Goals Addressed: 1, 2, 3, 4, 5, 7

Issue/Background: Extreme heat events are closely related to drought, climate change, and tree mortality when it comes to impacts to District operations. Extreme heat events can range in severity and duration, leading to varying increases in water demand/use along with hazardous work conditions for employees who work outdoors to maintain District function. Extreme heat events typically occur at lower elevations in western Nevada County and can last for short or long periods of time, though climate change may create variations to these conditions that push the reach of affected areas higher in elevation for a longer duration. Extreme heat events can have fatal effects on native vegetation and trees, leading to stress, partial/complete failure, or increased mortality. Extreme heat events have the potential to cause earlier melt off of snowpack, should these events occur earlier in the summer, leading to water availability issues in the late summer when resources are needed most.

Project Description: Removal of hazardous trees with potential to strike District Facilities or recreational visitors to campgrounds based on their potential to fail during extreme heat events

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented:

Responsible Agency/ Department/Partners: Nevada Irrigation District

Cost Estimate: $500 - $8,000 per tree removed depending on location, size, and disposal

Benefits (Losses Avoided): Reduced likelihood of loss of life and property due to trees or parts of trees falling due to extreme heat events.

Potential Funding: Nevada Irrigation District; Hazard Tree Removal Grants

Timeline: Annual

Project Priority (H, M, L): High

Action 23. Tree Mortality Mitigation

Hazards Addressed: Tree Mortality

Goals Addressed: 1, 2, 3, 4, 5, 6, 7

Issue/Background: Drought and pest related tree mortality is a serious issue facing the District and the Sierra Nevada Region of California. Prolonged drought is leading to an increase of forest pests and diseases that are targeting trees stressed by drought; leading to widespread and above average levels of tree mortality. Increased tree mortality is a threat to district facilities and infrastructure as standing dead trees have a higher potential to fall and damage infrastructure. Dead and dying trees also pose a significant fire risk as dead and dry vegetative material acts as prime fire fuel. Governor Brown declared a state of emergency in 2014 due to the unprecedented level of tree mortality in California, stating that there were 22 million dead trees in 2014 throughout California with tens of millions expected to die by the end of the year. Part of the state of emergency declared that agencies, utilities and local governments shall undertake efforts remove dead and dying trees in high hazard zones. The Tree Mortality Task force, comprised of state and federal agencies, local governments and stakeholders determined in 2017 that Placer county and the Tahoe National Forest were high priority areas based on their high tree mortality (Placer: 774,000 trees from 2010-2016; Tahoe; 718,000 from 2010 – 2016)

Project Description: Annually assess and remove as necessary standing dead, dying and diseased trees with potential to strike district infrastructure, visitors, or structures adjacent to district owned property in the event of failure. Removed downed woody debris where feasible and accessible to reduce wildfire threat and spread of fatal tree diseases. Thin understory vegetation and selectively harvest open watershed lands to increase health and potential success of residual trees and remove trees who have become a host to forest pests with potential for mortality or spread of pest species.

Other Alternatives:

Existing Planning Mechanism(s) through which Action Will Be Implemented: Draft District Forest Management Plan, English Meadow Forest Management Plan

Responsible Agency/ Department/Partners: Nevada Irrigation District, CAL FIRE, Sierra Nevada Conservancy, Wildlife Conservation Board, US Forest Service

Cost Estimate: $100,000 annually

Benefits (Losses Avoided): Reduced loss of District infrastructure, life and property due to damage caused by falling trees. Reduced loss of healthy trees to increased tree mortality by increasing health and the trees ability to fight off pests. Remove excessive fire fuels which threaten existing life healthy trees

Potential Funding: CAL FIRE, Sierra Nevada Conservancy, CABY

Timeline: Annual

Project Priority (H, M, L): H

Action 24. 2015 Urban Water Management Plan – Updated 2021

Hazards Addressed: Climate Change, Drought

Goals Addressed: 1, 2, 3, 4, 5, 7

Issue/Background: The Urban Water Management Planning Act requires every urban water supplier providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually to adopt and submit a UWMP every five years to the California Department of Water Resources (DWR). The Act describes the contents of the UWMP as well as how urban water suppliers should adopt and implement the UWMP.

Project Description: This UWMP addresses the District's water system and includes a description of the service area, water use, water supply sources, and a comparison of water supply and water demands during normal, single dry, and multiple-dry years. Also described is the District's water conservation program. This UWMP is the year 2015 UWMP as required by the Urban Water Management Planning Act of 1983 (Act). The Act is described in California Water Code Division 6, Part 2.6, Sections 10610 through 10657.

Other Alternatives: No action.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Plan For Water – Raw Water Master Plan

Responsible Agency/ Department/Partners: NID

Cost Estimate: Various

Benefits (Losses Avoided): See Plan

Potential Funding: NID - Grants

Timeline: Continuous

Project Priority (H, M, L): Medium

Action 25. Vegetation Management Plan (Hydroelectric Facilities)

Hazards Addressed: Climate Change, Wildfire, Tree Mortality

Goals Addressed: 1, 2, 3, 4, 5, 6, 7

Issue/Background: This Hydroelectric Facilities Vegetation Management Plan ("VMP") addresses vegetation modification guidelines and best practices to minimize wildfire risk associated with the District's

powerhouses and related transmission lines, penstocks, and flumes located within the District's boundary in both Nevada County and Placer County, California. The VMP has been developed to identify best management practices for vegetation management methods and applications for the District's seven (7) powerhouses and their associated transmission lines, penstocks, and canals/flumes. The VMP was also developed with the inclusion of invasive weed management, revegetation, and human and resource protection measures as appropriate.

Project Description: The purpose of the VMP is to provide fire prevention procedures, reporting, and safe fire avoidance and suppression practices for District personnel and contractors responsible for operating and maintaining the existing District hydroelectric facilities. A primary purpose of the VMP is to establish procedures and protocols for management of native vegetation and treatment of invasive weeds in order to maintain a desirable environmental condition that is consistent with the safe and effective operation and maintenance (O&M) of District hydroelectric facilities. The VMP contains descriptions of specific vegetation management actions, including treatment of invasive weeds, which the District will use to achieve desired conditions in and around project-related transmission corridors, hydroelectric facilities, and access roads that are associated with each of the District's seven powerhouses. The vegetation management strategies outlined in the VMP describe how the District will achieve a variety of desired conditions, dependent on the type of site, from bare ground (powerhouses and switchyards) to compatible native vegetation communities (penstocks and transmission corridors).

Other Alternatives: No action.

Existing Planning Mechanism(s) through which Action Will Be Implemented: This will create a planning mechanism.

Responsible Agency/ Department/Partners: Nevada Irrigation District

Cost Estimate: To be determined.

Benefits (Losses Avoided):

- Fire prevention procedures
- Reporting
- Safe fire avoidance and suppression practices
- Resource protection
- Reduce risk of fire
- FERC license and regulatory compliance
- Vegetation control

Potential Funding: NID or Grants

Timeline: On-going

Project Priority (H, M, L): Medium

Action 26. Water Planning Projections

Hazards Addressed: Drought, Climate Change

Goals Addressed: 1, 2, 3, 4, 5, 7

Issue/Background: The need to update NID's Water Planning Projections is driven by a series of requirements and assumptions, including the new Yuba-Bear System Federal Energy Regulatory Commission (FERC) regulatory requirements, state-derived climate change data, and the state-mandated planning requirements. Together, these requirements and assumptions constitute significantly new planning assumptions and drive the need to update and revise NID's Water Planning Projections when necessary.

Project Description: The Water Planning Projections consists of three studies that analyze the hydrology, water supply and water demand that help NID determine if its water storage and delivery system will provide sufficient water to meet customer demands over time and under variable conditions. The Water Planning Projections are used to prepare a number of planning reports such as the Urban Water Management Plan and the Agricultural Management Plan required to be updated and submitted to the State of California every five years. The Water Planning Projections is also used to prepare the District's Plan for Water, formerly called a Raw Water Master Plan, and is considered when making decisions about capital improvements to its water storage and delivery system.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: No existing mechanisms.

Responsible Agency/ Department/Partners: NID

Cost Estimate: Various

Benefits (Losses Avoided): See Projections

Potential Funding: NID - Grants

Timeline: Continuous

Project Priority (H, M, L): Medium

Action 27. Water Service Auburn Valley CSD

Hazards Addressed: Water Supply Reliability

Goals Addressed: 1, 2, 3, 4, 5, 7

Issue/Background: The Auburn Valley CSD is a small subdivision on the north end of Placer County. The water supplied to the subdivision is accomplished through a number of ground water wells. Current

drought conditions have exposed some well yield issues that have affected the available water supply to the area.

The District has the potential to supply the subdivision with treated surface water from either its North Auburn or Lake of the Pines water systems. Both connection points would take a substantial amount of infrastructure in pipelines to connect. Regardless, should the Auburn Valley CSD's wells go dry, an alternative water supply will be needed in short order.

Project Description: Installation of treated water pipeline to serve community from the District's North Auburn WTP.

Other Alternatives: Auburn Valley could drill more wells or purchase surface water from NID and treat onsite

Existing Planning Mechanism(s) through which Action Will Be Implemented: Auburn Valley is not within NID's service boundary; however efforts to include them are already underway. Once inside, the District would have the opportunity to provide water, be it treated or raw. The project would be handled by the Nevada Irrigation Districts Engineering Department.

Responsible Agency/ Department/Partners: Nevada Irrigation District / Auburn Valley CSD

Cost Estimate: $1.5 Million to connect to the Districts treated water system.

Benefits (Losses Avoided): Reliable water supply to a vulnerable system. This would alleviate a potential public health and safety issue should the CSD run out of water.

Potential Funding: Grants, Private Funding

Timeline: 3 to 5 years

Project Priority (H, M, L): Currently medium priority as the District works to include the area within its boundaries.

Action 28. Forest Resilience and Wildfire Risk Reduction

Hazards Addressed: Wildfire

Goals Addressed: 1, 2, 3, 4, 5, 6, 7

Issue/Background: All communities within the northwestern portion of Placer County served by the NID are listed on the National Fire Plan's "Communities at Risk" list as set forth in Section 4.3.2 of the main plan. Over one hundred years of aggressive fire suppression under the national fire suppression policy has rendered wildlands severely overgrown. Much of the private land in the District's area is in the wildland urban interface with increasing residential development. As more people move into the area and impacts from recreational demands increase, there will be more human-caused wildfire starts each year. And the increased number of widely scattered homes within the District adds greatly to the danger, complexity, and cost of fighting these fires. Forest overgrowth due to the efficiency of modern firefighting techniques, and

the vast acreages of land in need of understory thinning or selective harvest to decrease the fuel without natural fire is a serious problem. If wildfire does not impact the forest first, native insects and diseases which thrive in dense forest conditions may eventually kill millions of trees; further adding to the accumulated dead and dry fuels that would otherwise have been cleared out by low intensity fire. Explosions in insect populations usually start during a drought, when the lack of water combined with overcrowded forest conditions impact the trees' ability to reject the insects. Without a change in management practices on public lands, there is little hope of avoiding unusually high tree mortality experienced by other national forests. The size in acreage and the severity of wildfire in California is increasing. Five of the top twenty largest California wildfires occurred in 2020. The deadliest and most destructive of which was the Camp Fire which burned over 150,000 acres, 18,000 structures, and caused at least 85 fatalities in 2018. The massive scale of this wildfire had significant impacts to not only the public, but utility infrastructure as well. Costs of disaster related debris removal, emergency protective measures to protect life and property, and permanent repair to damaged or destroyed infrastructure, including repair and replacement of Paradise Irrigation District's water system features, reached more than $129 million, The most notable recent wildfire to impact the District was the Jones Fire in 2020. The wind driven fire occurred in the South Yuba River canyon and burned over the Districts Newtown Canal. 21 structures and 705 acres were burned during the 12 day fire, having impacts to communities as well as infrastructure and the health of the landscape within the burn area.

Project Description: Reduce the density, and horizontal and vertical connectivity of fire fuels on District-owned property. Properly managed forest stand will be less likely to spark ignition, support an existing fire, or allow a less dangerous ground fire to reach the canopy where it will become a severe crown fire. Areas of high ignition potential, such as campgrounds, are prioritized for treatment along with important infrastructure and District and Private structures. Ongoing vegetation removal and control along the Bowman Transmission Line

Other Alternatives: Prescribed burning as a maintenance of desired condition.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Draft District Forest Management Plan

Responsible Agency/ Department/Partners: Nevada Irrigation District, CAL FIRE, Sierra Nevada Conservancy

Cost Estimate: $2,000 - $3,000 per acre for fuel reduction. $100,000 annually for transmission line vegetation management.

Benefits (Losses Avoided): Infrastructure defense, maintenance of high water quality, avoidance of costly repair and replacement, protection of life and property.

Potential Funding: Nevada Irrigation District, CAL FIRE CFIP Grant, Sierra Nevada Conservancy,

Timeline: Reoccurring annually.

Project Priority (H, M, L): High